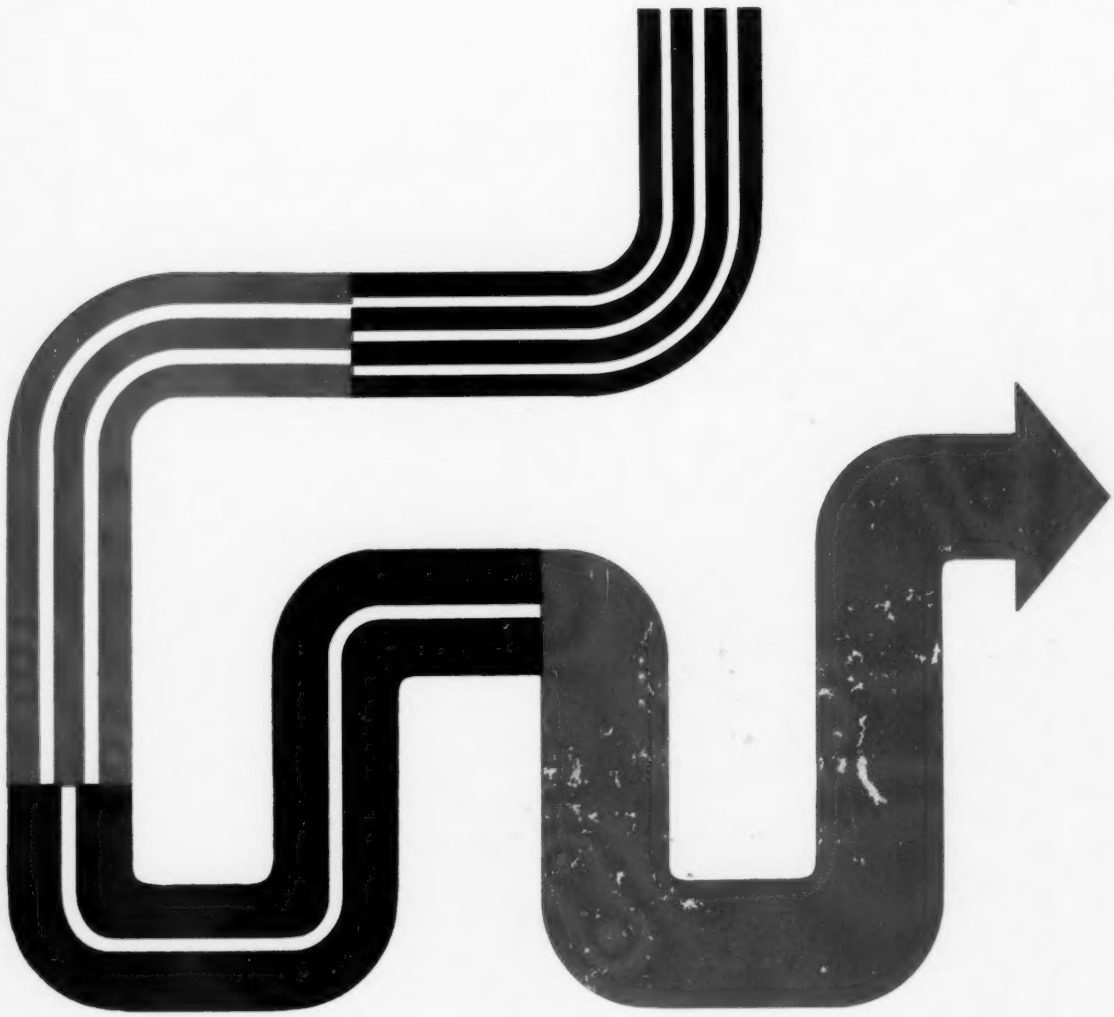
FEEDBACK..What is it? Where to use it?
(A Special FLOW Report - - See page 72)

FLOW

MATERIAL HANDLING · PACKAGING · SHIPPING

JANUARY 1956



Single Assembly System for Four Product Lines . . . page 61

With this symbolic interpretation of the flow of materials through production in a new plant, FLOW introduces a fresh and dynamic concept in cover designs.

NOELTING **Faultless** **CASTER MATERIALS HANDLING FACTS**

No. 11 in a series of Caster Achievements for men in industry

FROM SMOKE ROOMS TO BUSY FREIGHT TERMINALS . . .

FAULTLESS GREASE SEALED CASTERS PROTECT PRODUCTS AND COSTS

SERIES 900GS CASTER
Cut-away to show grease sealed double ball bearing swivel.

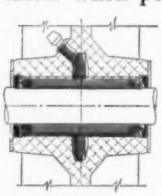
LEAK-PROOF NEOPRENE RETAINER MOLDED AND VULCANIZED ON UPPER BEARING SWIVEL RACEWAY. PATENT PENDING.

THRUST BEARING GREASE RETAINER TIGHTLY FITTED AROUND FORMED, HARDENED RACEWAY. CAN BE EASILY REMOVED FOR CLEANING OR INSPECTION.

Washers with Neoprene are press-fitted into hub. The Neoprene cross section reveals area provided to lock grease against leakage and to assure free running wheel.

Packing house temperature extremes of 0°F to 200°F, brine and steam, do not affect the triple-sealed bearings of Faultless 900GS Casters. A Neoprene retainer surrounds, and is vulcanized to, the upper swivel bearing raceway. A permanent film of grease, between the Neoprene retainer and top-plate, greatly reduces friction—accelerates swiveling—minimizes "down-time" and plant interruptions by sealing out water, dirt, chemicals, etc.

Freight and production lines move faster when permanent Caster lubrication assures easy rolling and swiveling. No grease can drip, floors are clean and safe. More loads can be moved by one man.



NEOPRENE HUB SEAL
Heavy Neoprene seal is formed around metal washer to lock grease within roller bearing.

For further information on Faultless Series 900GS Casters write today for Bulletin 157-3G, no obligation.

FAULTLESS CASTER CORPORATION
EVANSVILLE 7, INDIANA
Offices in Atlanta, Baltimore, Boston, Buffalo, Chicago, Cleveland, Dallas, Detroit, Grand Rapids, High Point, Indianapolis, Los Angeles, New Orleans, New York, Philadelphia, Portland, Seattle, St. Louis. Canadian Stratford, Ontario.

Circle No. 68 on Reader Service Card for more information

Fork full of "spaghetti"

—and Goodyear Industrial Tires roll up miles of it

STEEL shavings and cuttings can be murder on fork-lift tires—as the maintenance man for the smelting mill truck above found out. Then a Goodyear Industrial Tire Expert was called in.

He studied the trucks, the loads and the floor surfaces—and recommended Goodyear smooth tread pressed-on solids with the chip-resistant RED SEAL Compound.

Now this mill's industrial truck tires are giving far better, far longer wear.

And this is only one example of the service you can get with Goodyear. Because Goodyear Industrial Tires are built to fit the truck—*and the job.*

So today, call your Goodyear Dealer about job-fitting your trucks with Goodyear Industrial Tires. That way, you get the right tires for your jobs from America's most complete line of solid, pneumatic and semi-pneumatic Industrial Tires.

Or write: Goodyear, Industrial Tire Sales, Akron 16, Ohio.

GROOVE TREAD SOLID—
built to take heavy punishment on big trucks

SMOOTH-SOLID—
for factory, warehouse and loading platform

ALL-WEATHER TREAD—
for ramps, wet surfaces and other extra-traction conditions

ALL-SERVICE TREAD XTRA CUSHION—
built with compact lug design for fast, easy rolling with maximum smoothness and stability

USE THE RIGHT TIRE FOR THE JOB—BUY AND SPECIFY

GOODYEAR

Look for this sign; there's a Goodyear dealer near you.

All-Service, All-Weather, Xtra Cushion—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

INDUSTRIAL TIRES

Circle No. 74 on Reader Service Card for more information

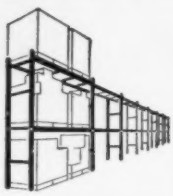
"Stack up" with American STORAGE RACKS

ERECTED WITHOUT BOLTING OR WELDING

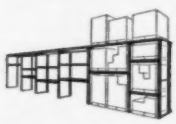
AN EXCLUSIVE AMERICAN FEATURE

....Cut your Handling and Warehousing Cost

When you "stack up" with American Tubular Storage Racks, you also "stack up" savings. The ingenious and simplified American feature, "erected without bolting or welding," has made them first choice with many businesses both large and small. American Racks are designed to meet practically every storage need. Send for catalog and get the facts on American before you buy any type of rack.

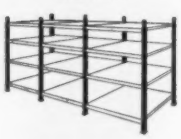


Standard Pallet Racks



Adjustable Pallet Racks

Skid Racks

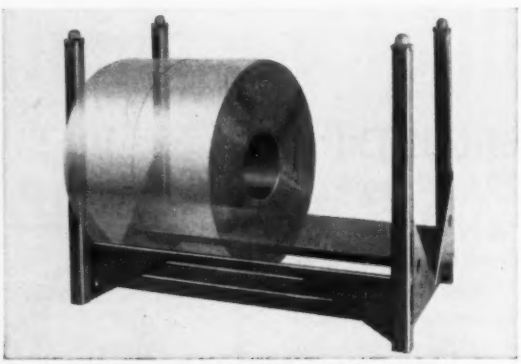


Tool & Die Racks

Drum & Barrel Racks

Coil Racks & Tiering Racks

send for catalog



EXTRA HEAVY DUTY COIL RACK
10,000 pound capacity

AMERICAN
METAL PRODUCTS CO.

STORAGE RACK DIVISION
5959 Linsdale • Detroit 4, Michigan

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Minato-Ku, Tokyo

The BIG, BIG 60-INCH DIFFERENCE *in aisle space means money in your pocket!*

Conventional counterweighted truck needs 136″ aisles... Automatic's TRANSVEYOR needs only 76″... *Use the difference for storage!*

The above dramatically illustrates the savings in storage space made possible with the Transveyor. Its short chassis and tight turning radius also enables it to operate swiftly and efficiently in cramped areas throughout the plant where less maneuverable trucks could not work.

Rugged and compact, the Transveyor is packed with exclusive Automatic job-proved features. Its *Balanced Action* equalizes load on both wheels, automatically...compensates for uneven floor surfaces with the exclusive center-pivoted feature which eliminates frame distortion and uneven load distribution.

Transveyors are available in stacker, low lift pallet or platform models to serve a wide range of requirements. All can be leased under Automatic's exclusive "Earn-Its-Own-Way" plan without 1¢ of capital investment. Convenient budget purchase plan is also available. Send for complete information today.

Dimensions based on use of 48″ x 48″ pallets

GET THE FACTS...MAIL THIS COUPON

Automatic®

WORLD'S LARGEST EXCLUSIVE BUILDER OF ELECTRIC-DRIVEN INDUSTRIAL TRUCKS

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☐ Send me complete information on Automatic Transveyors.
☐ Include data folder on the Automatic "Earn-Its-Own-Way" plan.

Firm.....

By.....Title.....

Address.....

City & Zone.....State.....

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No More Manual Handling--Anywhere!

At last- a mass produced quality machine at low price for materials handling jobs up to 1,000 lbs.

Now-

stores, shops, warehouses, post offices, depots, farms, schools, universities, hotels, hospitals, restaurants, service stations, etc. CAN AFFORD one or more battery operated hydraulic lifts.

More than Ever-

large and small plants alike can economize with *fleets* of BIG JOE lifts to achieve "hydraulic handling for *every* department."

COMPARE THE *Challenger*

FOR QUALITY

FOR PERFORMANCE

FOR PRICE

BIG JOE
Hydraulic Lift TRUCKS

THE CHALLENGER is another "In-Between-Handling" Tool originated and developed by BIG JOE. *Every* BIG JOE lift is *guaranteed for quality.*

$387.50

BIG JOE MANUFACTURING COMPANY •
900-08 Jackson Boulevard Chicago 7, Illinois

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JANUARY 1956
VOL. 11, NO. 4

FLOW

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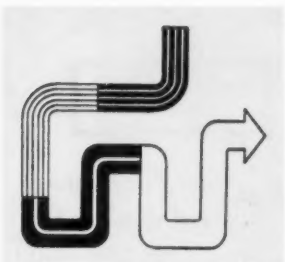

THE COVER

To reflect the spirit of dynamic progress in material handling, FLOW starts, with this issue, to work with noted industrial designer C. Cykowski. His cover symbolizes the uninterrupted flow of parts, from a single supply system to multiple product lines, discussed in the article starting on page 61.

BPA

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FLOW'S MATERIAL HANDLING ILLUSTRATED
PRECISION METAL MOLDING
APPLIED HYDRAULICS
INDUSTRY AND WELDING
WELDING ILLUSTRATED
OCCUPATIONAL HAZARDS
COMMERCIAL REFRIGERATION AND AIR CONDITIONING

FEATURES

Single Supply System for Separate Product Lines ... 61

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another First from PRESTO!

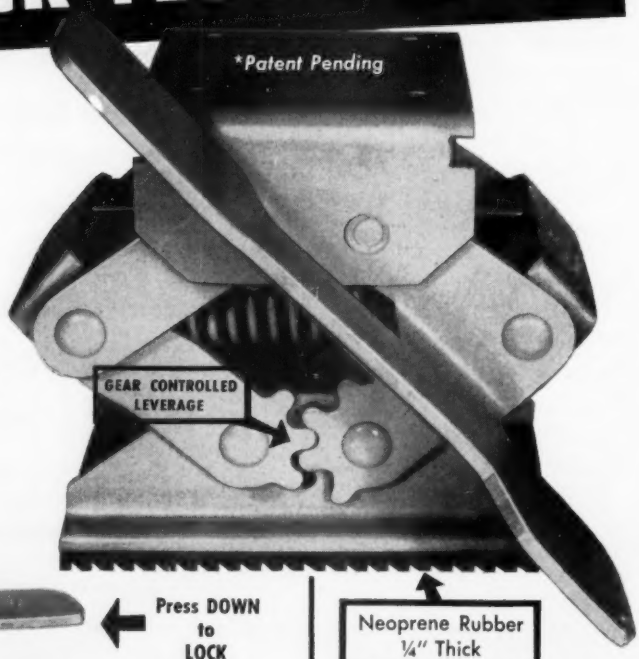
THE NEW PRESTO*
5-in-1 TRUCK FLOOR LOCK

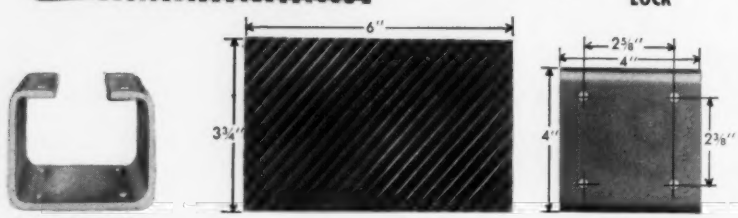
*Patent Pending

The only truck floor lock of its kind available. It's new, it's different, it's revolutionary. Makes all other truck floor locks obsolete.

Use the new PRESTO 5-in-1 Truck Floor Lock with 3", 4", 5", 6" and 8" casters. One PRESTO Truck Floor Lock fits five sizes.

Ideal for use on: Scaffolds, portable benches, tool stands, floor trucks, lifters, work stands, portable scales, portable conveyors, engine stands, etc.





Adapter Bracket
for use with 8" casters

Traction Plate
Large gripping surface made of moulded neoprene rubber

Mounting Plate
Hole centers drilled and tapped ⅜"—16

SPECIFICATIONS

Lock, collapsed	3¼"
Lock, fully extended	7½"
Lock, fully extended, with adapter	11"
Minimum floor clearance	2" with 4" caster

WEIGHT (each)

Without adapter	7 lbs.
With adapter	7½ lbs.

Adapter is used only with 8" casters.

Floor clearance is much greater with larger casters. Mounting Height — No fixed mounting height required. Mounting height can vary substantially. This floor lock will function with all casters from 4" to 8".

Because of its all steel construction, the PRESTO Truck Floor Lock may be bolted in place or it may be welded in place.

Check These Features and write for a new LOW, LOW PRICE!

- ☐ All Steel rugged construction
- ☐ Gear controlled leverage
- ☐ Pressure dual spring loaded
- ☐ Ample ground clearance
- ☐ On and Off pedal easily accessible
- ☐ Easy to apply, easy to release
- ☐ Large friction pad — moulded neoprene rubber
- ☐ Mounting plate drilled and tapped — can be welded
- ☐ Mounting height can vary
- ☐ Light in weight, strong, durable, trouble-free
- ☐ Will work where others fail

Distributors!!
Reduce your inventories — one floor lock fits five size casters.

PRESTO PRODUCTS CO.

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Division of Lee Engineering Company

QUALITY is our Most Important Product

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ELPAR
"Air-Rights" Series
FORK TRUCKS

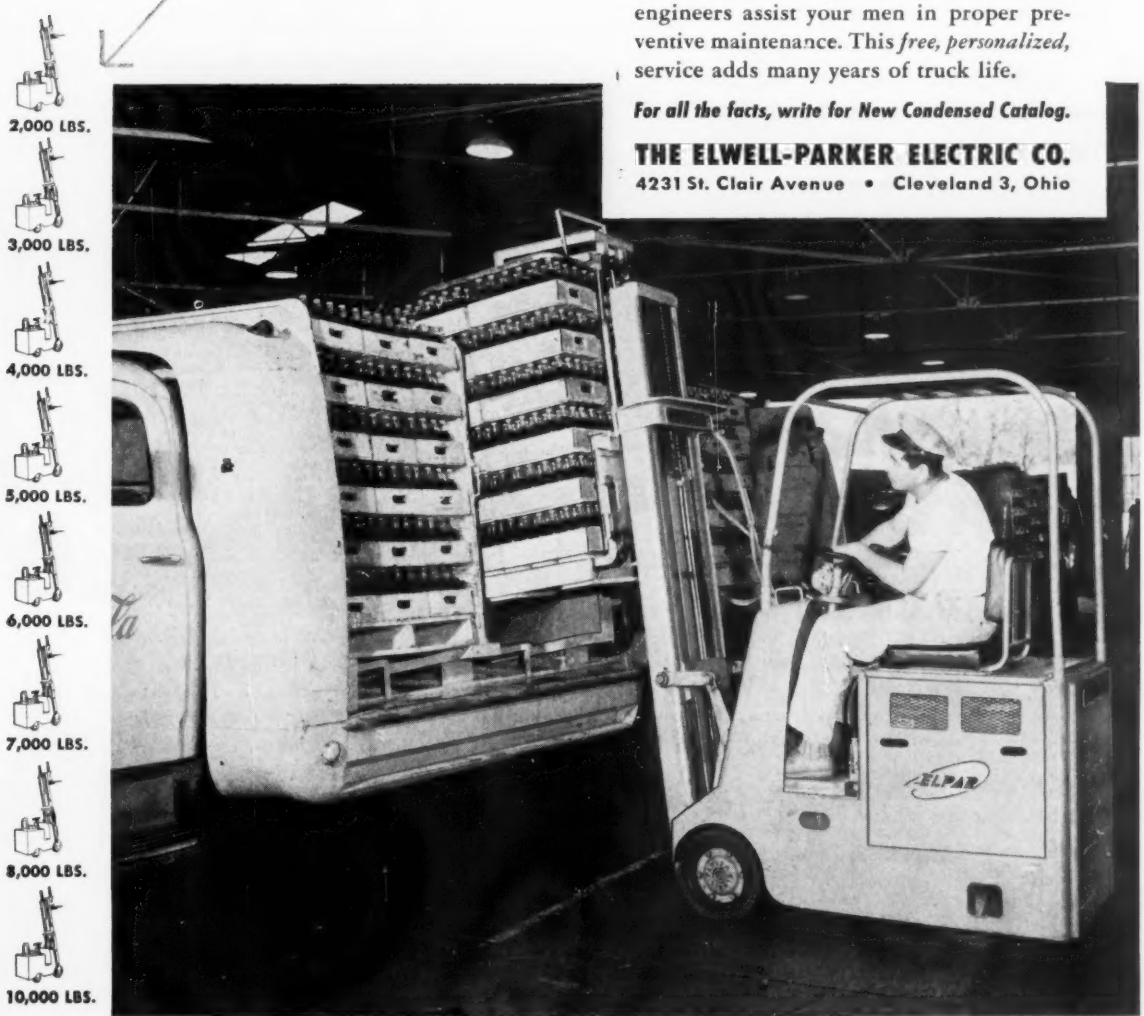
Complete Line For Low Cost Handling

The extensive ELPAR "Air-Rights" series includes the exact fork truck for your requirements. Here are five reasons why: **1.** Capacities range from 2,000 to 10,000 pounds (in increments of 1,000 pounds), and larger trucks up to 80,000 pounds are also available. **2.** Electric, gas-electric, Diesel-electric or LP gas-electric power can be supplied. **3.** Models include sit-down or stand-up, center or end control. **4.** There is a wide range of lift heights for every operation—carrier loading or extra-high stacking, light or heavy-duty work. **5.** ELPAR trucks can be specially adapted or equipped with any of a score of special attachments for out-of-the-ordinary jobs.

ELPAR electric trucks give fume-free, pennies-per-day operation with minimum maintenance. As a *plus* benefit, ELPAR field engineers assist your men in proper preventive maintenance. This *free, personalized,* service adds many years of truck life.

For all the facts, write for New Condensed Catalog.

THE ELWELL-PARKER ELECTRIC CO.
4231 St. Clair Avenue • Cleveland 3, Ohio



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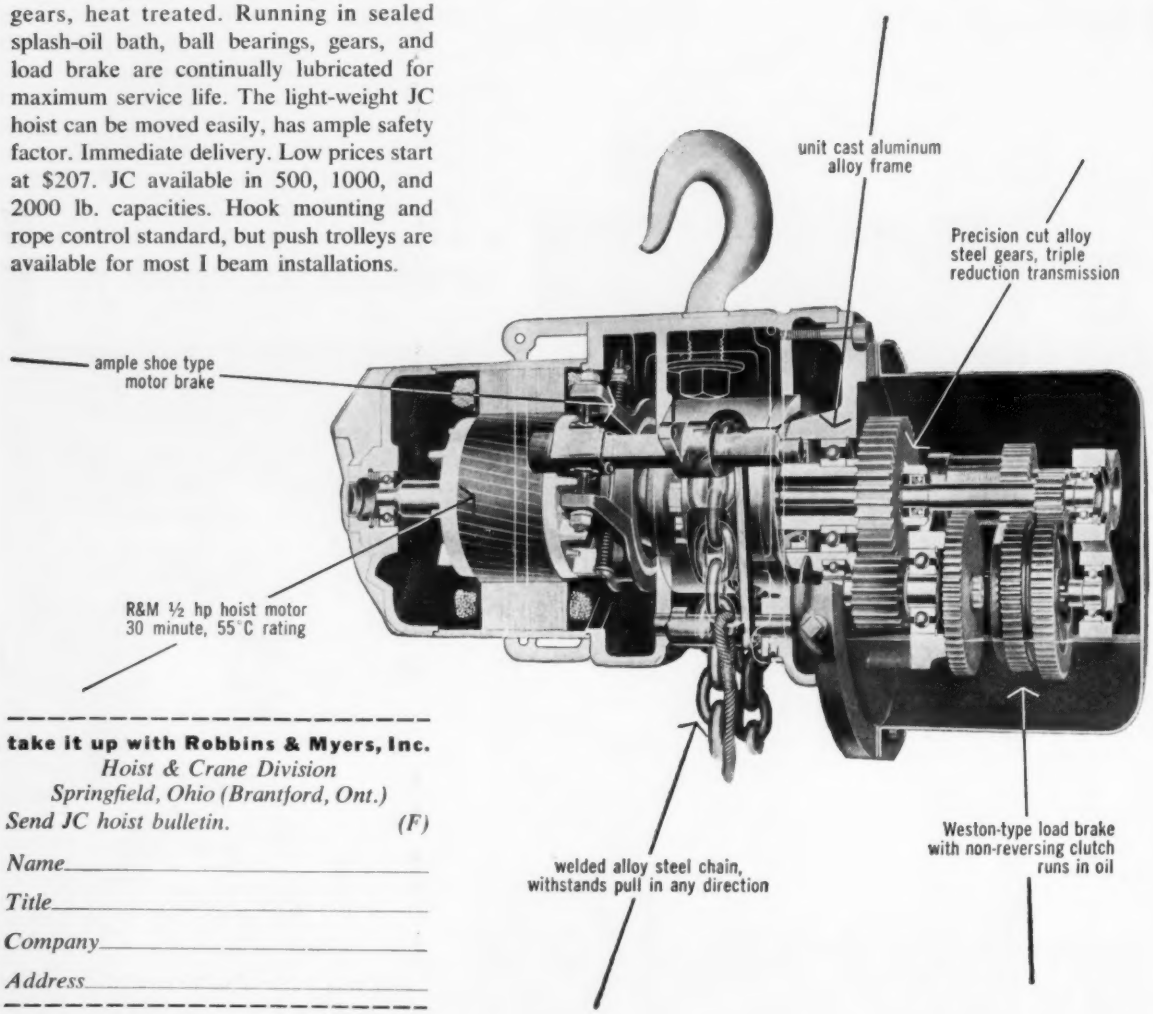
quality to spare

R&M JC chain hoists are ahead of competition in quality—right with it in price. See for yourself why more value for the same money is yours in the JC. The ½ hp R&M heavy duty motor is equipped with an oversize shoe brake to assure quick stops, accurate load spotting, longer life. Separate load brake is Weston-type, with non-reversing clutch to prevent drift. Gearing—triple reduction precision cut alloy steel spur gears, heat treated. Running in sealed splash-oil bath, ball bearings, gears, and load brake are continually lubricated for maximum service life. The light-weight JC hoist can be moved easily, has ample safety factor. Immediate delivery. Low prices start at $207. JC available in 500, 1000, and 2000 lb. capacities. Hook mounting and rope control standard, but push trolleys are available for most I beam installations.


unit cast aluminum alloy frame
Precision cut alloy steel gears, triple reduction transmission
ample shoe type motor brake
R&M ½ hp hoist motor 30 minute, 55°C rating
welded alloy steel chain, withstands pull in any direction
Weston-type load brake with non-reversing clutch runs in oil

take it up with Robbins & Myers, Inc.
Hoist & Crane Division
Springfield, Ohio (Brantford, Ont.)
Send JC hoist bulletin. *(F)*

*Name*_____
*Title*_____
*Company*_____
*Address*_____

ROBBINS & MYERS **hoists • cranes • winches**

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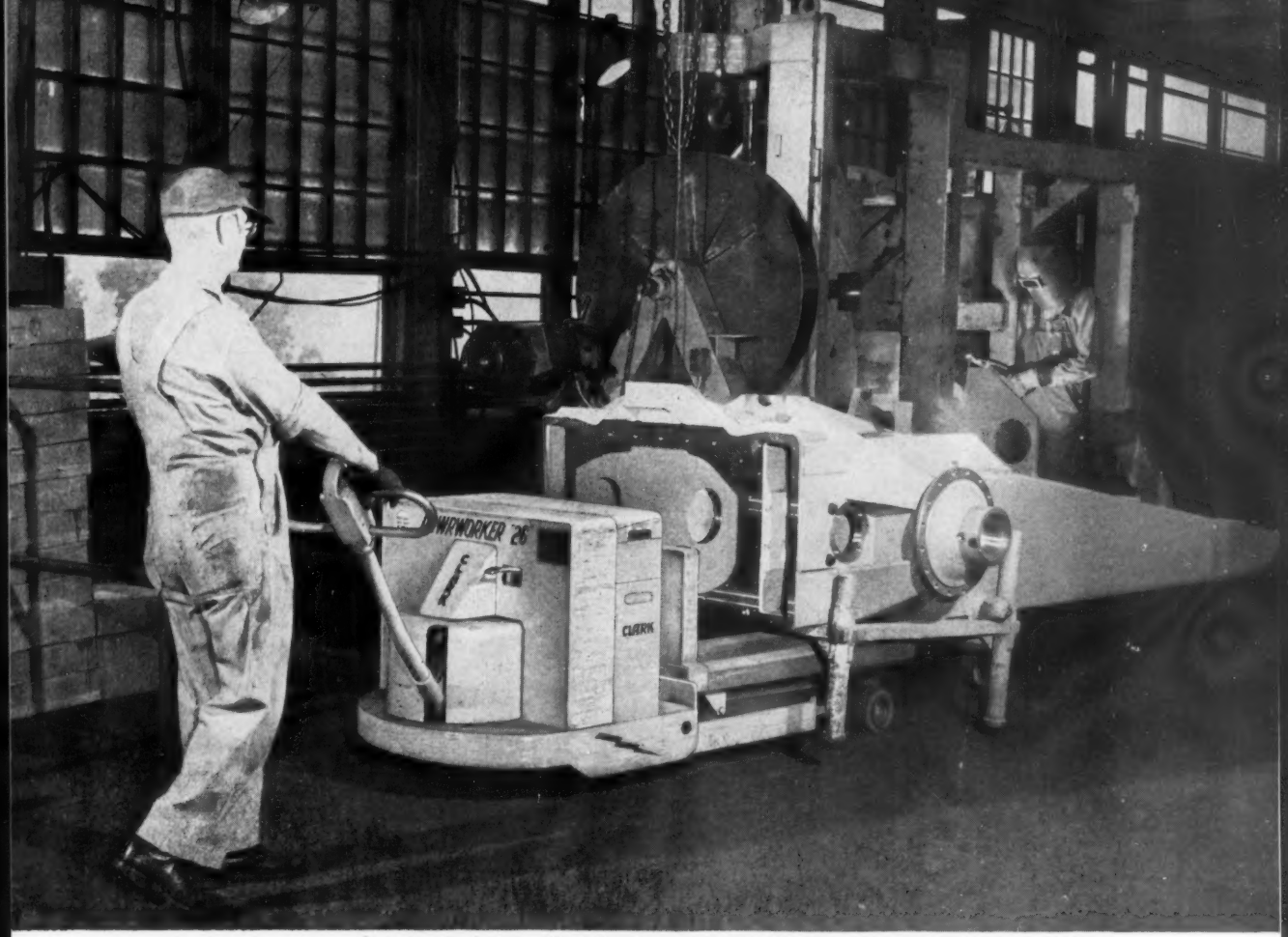
how many uses for



One reason Le Tourneau-Westinghouse specified Clark is the dependable local service offered by R. E. Common Equipment Co., Peoria. It's typical of *all* Clark dealers. It's smart business to do business—locally.

CLARK *POWRWORKER*®
at LE TOURNEAU-WESTINGHOUSE

"It takes more than features . . ."

Truck features are important. Fact is the Powrworker gives you more features than any other powered hand truck.

BUT PERFORMANCE DOESN'T *JUST* DEPEND ON FEATURES. How about a year from now, or two years, or five? That's when you depend on service—fast, local service.

And that's where your local Clark dealer comes in. Clark dealers have the largest supply of service parts in the industry—genuine Clark parts that are warranted and guaranteed for quality. He has factory trained men who *know* your machines. He provides prompt mobile service for emergencies, preventative maintenance right in your own plant, a completely equipped shop for rebuilding, and a fleet of rental trucks to help you over peak work loads. Here, is a *complete* service package.

SEE THE BONUS FEATURES of the Powrworker. Send for your copy of the new 16 page Powrworker booklet showing full details, cut-away views, reasons why the Powrworker will outperform any competitive machine on the market.

CLARK® EQUIPMENT

DON'T MISS THE MATERIAL HANDLING SHOW, JUNE 5-8, CLEVELAND, OHIO!

POWRWORKER SECTION, Industrial Truck Division

CLARK EQUIPMENT COMPANY

BATTLE CREEK 13, MICHIGAN

Circle No. 42 on Reader Service Card for more information

how many uses for DEXION in your plant?

Easy to cut. One stroke of DEXION cutter saves time.

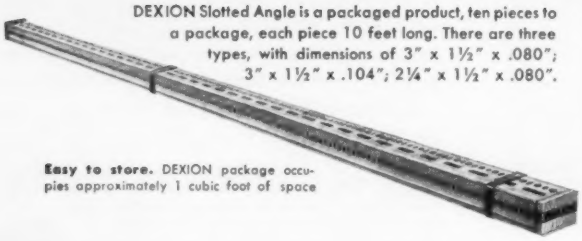
Simple to connect. Use only two wrenches.

DEXION panels. For shelving to support heavy loads.

Re-usable. Dismantle—rebuild into other equipment.

Here's why you'll want DEXION Slotted Angle over any other framing material

Only your imagination limits the applications of this ingenious slotted angle framing material. Users discover that they can build whatever they need—when they need it—and build it cheaper! Easily dismantled, DEXION Slotted Angle can be *reused* in new ways to meet changing needs. There's no waste! And anyone who can use a wrench and a saw (or DEXION cutter) can build with this precision-made slotted angle.



DEXION Slotted Angle is a packaged product, ten pieces to a package, each piece 10 feet long. There are three types, with dimensions of 3" x 1½" x .080"; 3" x 1½" x .104"; 2¼" x 1½" x .080".

Easy to store. DEXION package occupies approximately 1 cubic foot of space

GET the exciting new
DEXION IDEA BROCHURE,
which gives you full information. Write direct to the address shown below, Dept. 1B.

DEXION DIVISION
ACME STEEL COMPANY
2840 ARCHER AVENUE, CHICAGO 8, ILLINOIS

ACME STEEL

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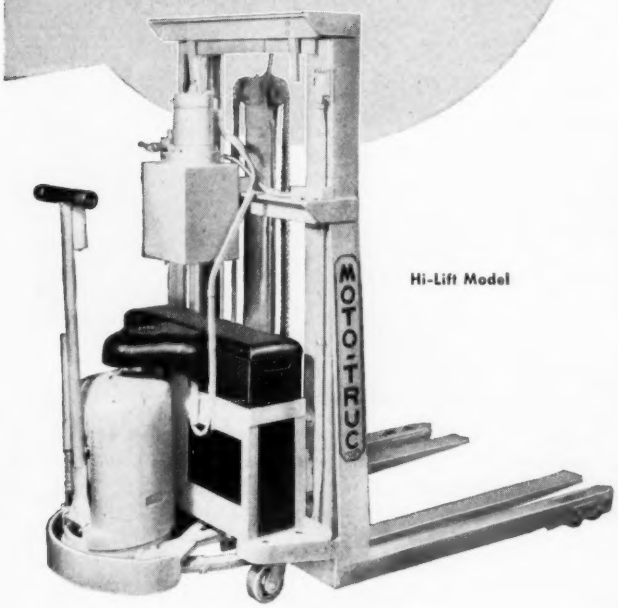
8 reasons why YOU should buy MOTO-TRUC



Hi-Lift Model

MANEUVERABILITY . . . shortest overall length

LOAD SAFETY . . . Low center of gravity, four point load support

SIMPLICITY OF OPERATION . . . patented roller grip controls

CONSTANT TRACTION . . . spring loaded drive unit on high lift models

LESS DOWN TIME . . . Interchangeable Power Unit

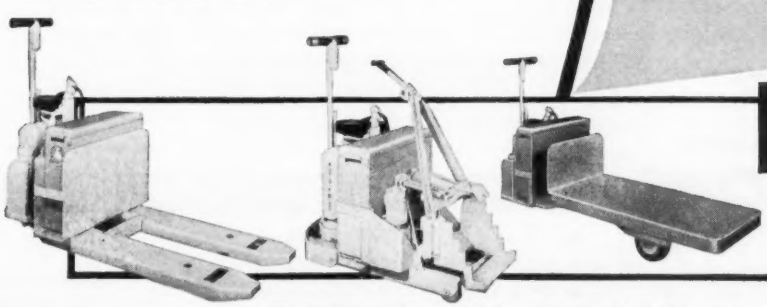
EASE OF MAINTENANCE . . . Simplified for quick service

RUGGED CONSTRUCTION . . . All welded frame construction

VERSATILITY . . . There's a MOTO-TRUC for every purpose

Whether your materials handling needs require standard equipment or must be custom built, it will pay to investigate MOTO-TRUC. From the very inception of the battery operated walkie type truck (developed by MOTO-TRUC in 1936) MOTO-TRUC design and development has set the "pace" in the industry.

The features listed above are only a few of the advantages offered by MOTO-TRUC. Write for literature covering *all* the features and models available.



MOTO-TRUC
Designers FOR THE INDUSTRY
PATENTED

The MOTO-TRUC Co.

Representatives in Principal Cities

1955 E. 59th St. • Cleveland 3, Ohio

Pallet . . . Platform . . . Hi-Lift Trucks

The *Originators* of the Walkie and Small Rider Type Truck.

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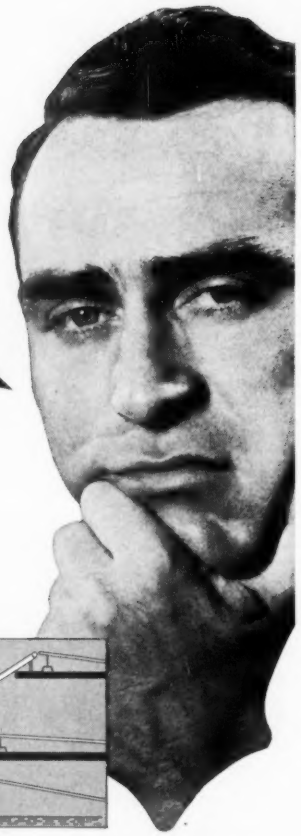
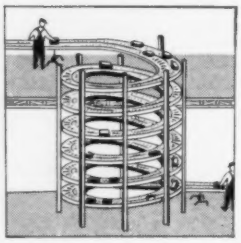
Want an IDEA?



to help solve a handling problem? Rapistan ideas are different — and save you money, time, space and effort!

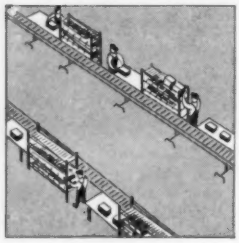
Time after time, Rapistan men have solved materials handling problems which seemed to have no solution. And they've been able to cut costs for many customers by detecting trouble spots, and suggesting a remedy. These are typical of the Rapistan ideas which have solved problems for all types of industries. . . .



A stack-up saved jam-ups

The problem was to provide in-process storage for quantities of a product released from baking ovens at one time, but processed at a regular rate.

The solution was a two-story spiral accumulator of wheel conveyor. The result is smooth production flow, and a saving of $30,000 in construction cost.

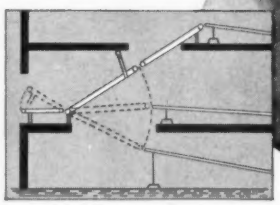


Go signal for stop & go assembly line

The problem was to provide a steady flow of work on a progressive assembly line with slightly different time requirements at each work station.

The solution was gravity wheel accumulators connecting work stations to provide a backlog of work-in-process.

The result is a smooth flow of assemblies without work stoppage, and the elimination of costly handling between stations.



Pinch-hitting conveyor saves space

The problem was to provide access to three floors from a receiving dock where space limitations made conventional equipment impractical.

The solution was a Floorveyor with a special bearing equipped pivot boot and a 1000 lb. electrical hoist.

The result is a power belt conveyor that can be raised or lowered to meet conveyor lines located in basement and on first and second floor.

Rapistan ideas come from the combined experience of more than 200 field men, who work with the most progressive engineering department in the business. Rapistan men face new problems every day . . . meet many which are new only to the customer. Similar problems, already solved by Rapistan for other customers, often make the solution simple and speedy. You owe it to yourself to call on Rapistan for materials handling ideas that can save you money, time and effort, too!

Rapistan®

There's a Rapistan man in your area . . . or write us direct about your problem.

BETTER CONVEYING EQUIPMENT

- GRAVITY CONVEYORS
- POWER CONVEYORS
- OVERHEAD CONVEYORS

The RAPIDS-STANDARD CO., Inc.
729 Rapistan Bldg. • Grand Rapids 2, Mich., U.S.A.

Circle No. 150 on Reader Service Card for more information

Now you can get new Hyster

"HYSTAMATIC" DRIVE

fluid torque converter for HC-50, YC-40 and UC-30 Lift Trucks (5000, 4000 and 3000 lbs.)

The most positive "Hairline Inching Control" for stacking, carloading and close-quarter operation.

"Hystamatic" offers the *best control of lift truck power,* makes possible smoother, faster, more effective lift truck operation.

"Hystamatic" incorporates all these latest design advances in fluid converter-type drives:

Automatic Operation speeds forward-reverse shifting—takes full advantage of Hyster fastest lifting speed.

Smoother Operation with finger-tip ease. Sudden shock loads in transmission are cushioned by hydraulic oil in torque converter. Power surges are eliminated.

No Engine Lugging. Torque converter automatically adjusts transmission reduction to driving conditions.

Simplicity of Design makes "Hystamatic" easy to service

Overhead guard is optional equipment.

PLUS...

Hairline Inching Control. Slip for starting and inching is taken through torque converter. Operator can position load in tightest quarters with precision. *"Hystamatic" greatly improves performance in stacking loads where it is necessary to inch and raise the load at the same time.*

Precision Control of Power to Wheels improves traction where traction is critical. Just the *right* amount of power to drive wheels is obtained by control of engine speed with throttle.

Call your Hyster Dealer for full details, or write for Form 1330.

HYSTER COMPANY

2931 N. E. Clackamas Street, Portland 8, Oregon
1031 Myers Street, Danville, Illinois
Hyster N.V., Nijmegen, The Netherlands

Four Factories: Portland, Oregon; Danville, Illinois; Peoria, Illinois; Nijmegen, The Netherlands.

Circle No. 88 on Reader Service Card for more information

Compact 25hp machine cleans 21" path . . .

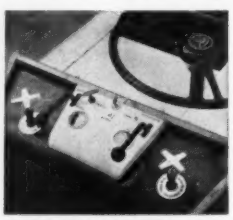
removes hard-packed soilage in 1 fast operation

This powerful new machine makes it easy for one man to do more than a 4 to 12-man crew—in cleaning factory floors.

In one operation the husky "Model L" instantly pulverizes bumpy traffic-packed dirt from a path 21" wide . . . and *picks it up at the same time.* Removes grease-caked soilage, metal chips, oil, rubber and other heavy deposits. Leaves a clean dry surface for trucking. Eliminates all need for water, steam, chemicals or costly hand scraping.

Easy to use; operator rides it

As machine propels itself, operator adjusts simple *hydraulic* controls for speed, forward-reverse, brush pressure, etc. Makes it easy for one man to clean 5,000 sq. ft. per hour . . . and handle 90% of all jobs in one pass. *Write today for more details about this EXCLUSIVE new machine and its cost-saving performance.*



HYDRAULIC CONTROLS regulate speed (1 to 3 mph), tool lift, brush pressure, etc. Very easy to use. Does clean job.

G. H. TENNANT COMPANY, 2576 N. 2nd Street, Minneapolis 11, Minn.

TENNANT FLOOR MACHINES

SPECIALIZED MAINTENANCE EQUIPMENT

Circle No. 178 on Reader Service Card for more information

LETTERS to the editors

Timeless Questions

To FLOW:

We are interested in obtaining information and comparisons, including figures, on the capabilities, efficiencies and economies of gasoline and electric powered fork lift trucks operating under normal conditions.

The relative merits of gasoline and electric power have been under discussion for some time in our company and we would like answers (and opinions) to questions such as these: Life Expectancy; Depreciation; Maintenance; Lubrication; Down-time; Power Costs.

Not only are we interested in gasoline versus electric, but also the merits of LP-gas powered fork lift trucks.

Any information will be appreciated, including reference material and advice.

Marshall Hills
Kendal Mills Division
The Kendall Company
Walpole, Massachusetts

A number of studies on the relative merits of fork trucks have been compiled by both manufacturers and independent agents. Information in our possession was forwarded the reader, together with suggestions for obtaining more complete data.

"I guess I'm having one of those days."

its Advantages are turned to greatest account by Louden

Overhead handling possesses fundamental and inherent advantages over any other system. And Louden's pioneering experience, broader range of equipment and engineering knowledge turn these advantages to greatest account in planning a handling system for you. The American Stamping Company, Cleveland, Ohio, installation shown here is a typical example. The customer's needs were limited. He wanted a much better die storage system in his new building than he had in his old. Louden had the engineering knowledge *but it also had the equipment the customer needed* . . . a stacker crane. Because this was so, storage facilities could be restricted to a small area with narrow aisles between racks. Yet the stacker crane, suspended from the rails above, moves freely and maneuvers freely in these aisles. It is operated by any one of the stamping machine attendants.

Louden is unique in the engineering vision and experience it brings to your problem . . . and in the wide range of equipment it has to draw upon. Louden overhead handling saves labor and cuts handling costs sharply. Louden handling travels more swiftly, speeds operations, often leads to increased production. Louden permits maximum utilization of floor space and air space too. It repays its cost within a year . . . within months . . . has done so within weeks. The least you should do is see what the best in engineering recommends. Then will be time for you to decide.

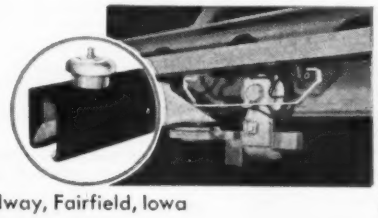
No more crowded, cramped stacking of dies along walls and needlessly wide aisles for trucking. In new American Stamping Co. building, Louden's engineering and equipment confine storage to 40 x 40 feet. Stacker crane moves on runways *above*, negotiates narrow aisles between racks easily, handles dies in and out of racks with delicacy, precision and speed.

Louden

MONORAIL & CRANES

THE LOUDEN MACHINERY COMPANY • 6301 Broadway, Fairfield, Iowa

A Subsidiary of Mechanical Handling Systems, Inc.

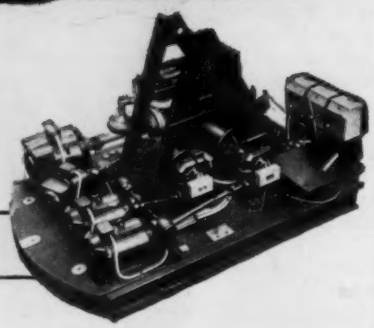


New! Louden Shokpruf Electrification . . . for all monorail and crane installations. Hazards of open conductor bars now completely overcome by this exclusive Louden engineering development. Write for full details of this safe conductor system.

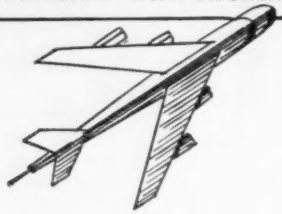
SINCE 1867 . . . THE FIRST NAME IN MATERIALS HANDLING

Circle No. 106 on Reader Service Card for more information

A 10,000-pound thrust Pratt & Whitney Aircraft J57 engine is lifted by crane from its dolly and will be mounted on the Boeing B-52A Stratofortress shown in the background. This scene, taken at Boeing Airplane Company's flight line on Boeing Field in Seattle, shows one of the production heavy bombers undergoing pre-flight work.



Precision with Mobility



PRECISION LIFTING

COLES gas-electric transmission can handle any load with smoothness, precision and with safety. Finger tip control, combined with clutchless operation, makes the crane simple to operate and economical to maintain.

THE ONLY CRANE WITH A ONE YEAR WARRANTY

The Name that Carries Weight in Material Handling

COLES CRANES INCORPORATED

Write for descriptive literature

COLES CRANES, Inc.
Box 942F
JOLIET, ILL.

Circle No. 45 on Reader Service Card for more information

LETTERS

Continued

Likes "Pros and Cons"

To FLOW:

I would like to express my thanks for the article "Pros and Cons of Equipment Leasing" by W. H. Campbell. It had a lot of meat in it and gave me some very valuable information. Give us some more of the same.

L. B. Hicks
Sears Roebuck & Co.
Cleveland, Ohio

Handling Problem

To FLOW:

My grist mill is of two-story brick construction, 20- by 75-feet. Two rooms on the ground floor with steel door between, have ten foot ceilings.

The west end of the building houses the grist mill, electricity and other fixtures. When we buy shelled corn, three- to five-hundred bushels, it is unloaded from wagons or trucks onto the front porch of the mill, then through a door into the east room, onto the floor in that room until ground.

What I need is to lift the corn to the second floor, where it will remain until needed for daily or weekly meal.

Practically all the top floor is available, but the unloading has to be at or on the east end.

Can you help me?

S. B. Miller
Gypsy Camp Store
Buena Vista, Georgia

Several suggested solutions have been forwarded.

FLOW '55 INDEX READY

The index of FLOW articles published during the year 1955 is available without charge. This handy reference is cross-indexed by subject and equipment-application. For your free copy, circle Reader Service Number 198.

Towmotor with upending roll clamp accessory, stacks 7000 pound liner board roll 17 feet high.

TOWMOTOR makes new plant really modern!

It's not so ridiculous as it might sound! No plant—new or not so new—is truly modern unless materials are "mass handled" the Towmotor way. You can eliminate wasted time and inefficiency in every phase of your manufacturing, receiving, storage, processing and shipping. The savings made with Towmotor are immediate and substantial. You can apply them to your own business. Write for a Towmotor Certified Job Study on your own industry. TOWMOTOR CORPORATION, Div. 801, 1226 E. 152nd St., Cleveland 10, Ohio.

TOWMOTOR
THE ONE-MAN-GANG®

FORK LIFT TRUCKS
and TRACTORS SINCE 1919

TOWMOTORS are made only by TOWMOTOR CORPORATION
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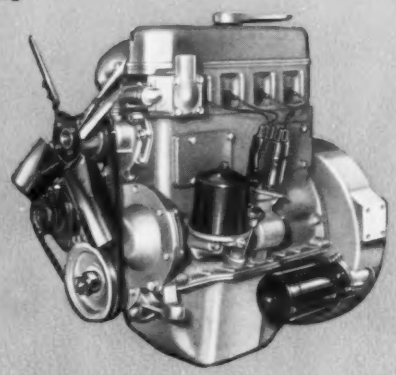
HERCULES *announces*

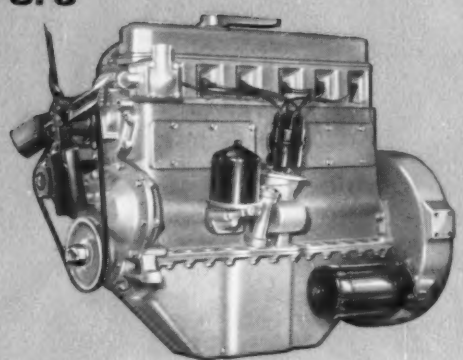
G. O. SERIES
GASOLINE OVERHEAD VALVES

G. O. 4



Model	Bore Stroke	Displ. Cu. In.	Max. H.P.
G.O. 173	3½"x4½"	173	67 @ 3200 R.P.M.
G.O. 198	3¾"x4½"	198	76 @ 3200 R.P.M.
G.O. 226	4" x4½"	226	87 @ 3200 R.P.M.

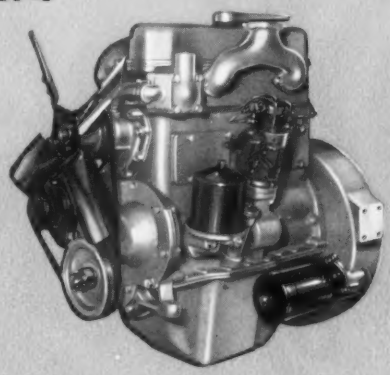
G. O. 6



Model	Bore Stroke	Displ. Cu. In.	Max. H.P.
G.O. 260	3½"x4½"	260	102 @ 3200 R.P.M.
G.O. 298	3¾"x4½"	298	114 @ 3200 R.P.M.
G.O. 339	4" x4½"	339	131 @ 3200 R.P.M.

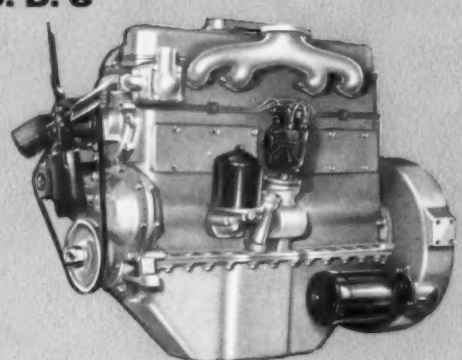
D. D. SERIES
DIRECT INJECTION DIESELS

D. D. 4



Model	Bore Stroke	Displ. Cu. In.	Max. H.P.
D.D. 173	3½"x4½"	173	50 @ 2000 R.P.M.
D.D. 198	3¾"x4½"	198	57 @ 2000 R.P.M.
D.D. 226	4" x4½"	226	65 @ 2000 R.P.M.

D. D. 6



Model	Bore Stroke	Displ. Cu. In.	Max. H.P.
D.D. 260	3½"x4½"	260	75 @ 2000 R.P.M.
D.D. 298	3¾"x4½"	298	85 @ 2000 R.P.M.
D.D. 339	4" x4½"	339	99 @ 2000 R.P.M.

Marine

Construction

Material Handling

Oil Fields

Agriculture

NEW MODELS

INTERCHANGEABLE

MOUNTING DIMENSIONS

GASOLINE
L.P.G.
KEROSENE
NATURAL GAS

DIESEL

MAJORITY OF PARTS

GASOLINE
L.P.G.
KEROSENE
NATURAL GAS

DIESEL

additions to the extensive line of HERCULES ENGINES

With the addition of these four new series consisting of 12 models, the Hercules Motors Corporation has increased its line of engine sizes and types to better serve the varied needs of the many different industries which require gasoline and diesel engines for their power requirements. This expansion of the Hercules line will enable manufacturers of end products to have a wider selection of engines and power units to meet individual requirements, all available from one dependable source.

Mounting dimensions of the new G.O. gasoline and D.D. diesel four cylinder engines are the same. The G.O. gasoline and D.D. diesel six cylinder engines are also interchangeable from the standpoint of mounting dimensions. Since this new series consists of parallel lines of gasoline and diesel engines, they can be used interchangeably, if desired, in any end product within the recommended engine speed ranges. Further, these engines can be built with manifolds and accessory equipment on either side, as the cylinder blocks are symmetrical and can be turned end for end.

Another important feature of these new models is the great number of parts which are interchangeable between the fours and sixes, and also, between the gasoline and diesel. This greatly simplifies the parts and service requirements. The only essential differences between these gasoline and diesel engines are cylinder heads, manifolds, pistons and fuel handling equipment.

Further information on the G.O. and D.D. series may be obtained by writing the factory.

Engine Manufacturing Specialists Since 1915

Automotive

Road Building

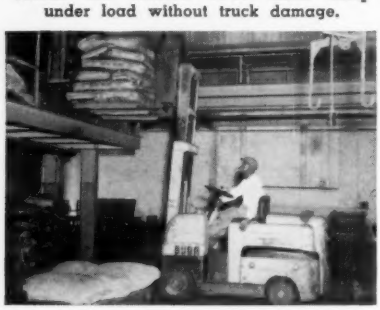
HERCULES MOTORS CORPORATION

CANTON, OHIO, U. S. A.

ALLIS-CHALMERS FORK TRUCKS

Dumping material by the ton — one of many daily operations.

Tracks are crossed 30-40 times daily under load without truck damage.



Inventory simplified, storage increased with ton-at-a-time tiering.

Cut Handling Time 30% at Chicago Malleable Castings Co.

In two years, Chicago Malleable Castings Co., a leading mid-western foundry, has been able to reduce handling time 30% on all materials handled with an Allis-Chalmers FT60-24 Fork Lift Truck.

In specific instances, such as the boxcar unloading of refractory brick, the truck has reduced by 90% the handling time formerly required by conveyor system.

Equipped with a rotating device, the truck is also used for handling foundry sand and other bulk materials, and also for loading, transporting, and unloading such products as bonding clay, machinery, and rough castings. All these operations have been accomplished more efficiently and in less time than was possible with equipment formerly used.

So impressive has been this performance record, that Chicago Malleable recently purchased another Allis-Chalmers truck for use in other areas of their modern plant. Used primarily for handling finished castings, including trailer-truck and boxcar loading, this truck handles 140 tons of materials in an average eight-hour day.

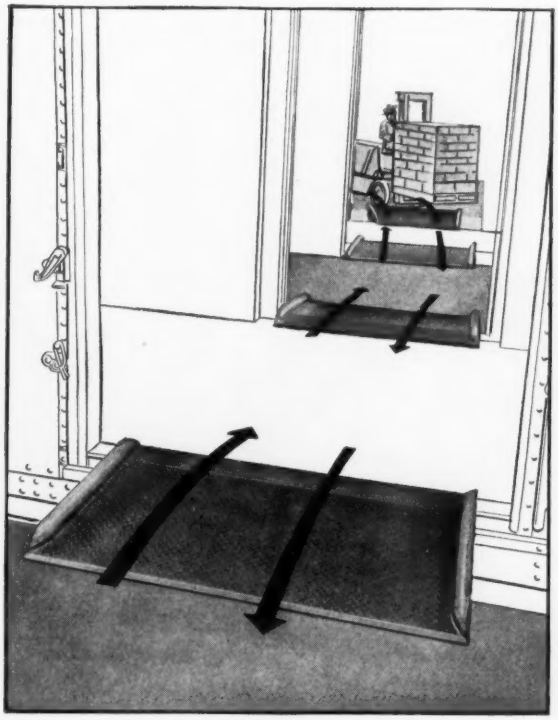
But utility is only part of the story. Maneuverability, ease of handling, low maintenance, and dependable, long-lived operation — even under adverse foundry operating conditions — are all features combined in every Allis-Chalmers Fork Lift Truck. It's the winning combination for progressive foundries throughout the country.

BUDA DIVISION • HARVEY, ILLINOIS

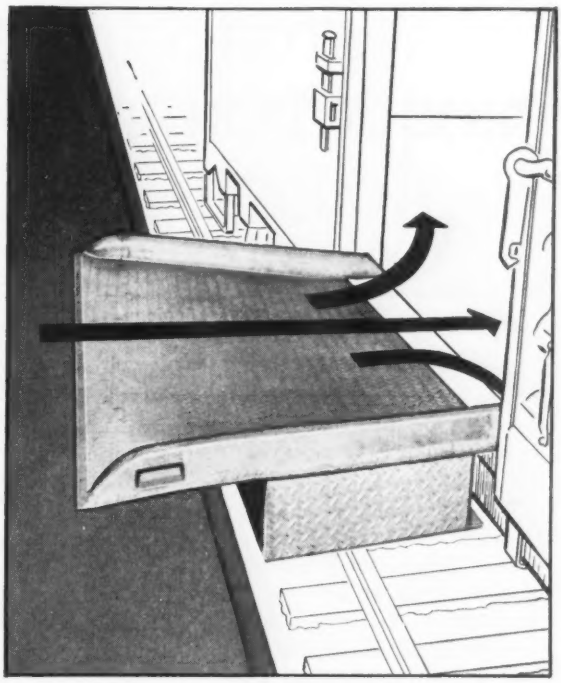
Write today for your free copy of our 36-page, fact-filled booklet which explains in detail the many exclusive features that make Allis-Chalmers Fork Lift Trucks the choice of industry everywhere.

ALLIS-CHALMERS A-C

Circle No. 32 on Reader Service Card for more information



Car-to-car loading problem?



Loading flush-with-floor, flush-with-door?

Solve these loading problems with Magcoa magnesium Dockboards

Car-to-car and car-to-dock loading— This familiar problem — handling loads through one car to another or to the dock—is solved every day by Magcoa Dockboards. Rugged locking devices, not visible in the photograph, assure a snug, slip-proof fit between cars and between car and dock. Notice that the Dockboard in the far background has one straight curb and one flared curb—a special design for use *at the end of a dock which is just long enough to permit simultaneous loading of three cars:* a simple solution, suggested by an alert Magcoa representative to a customer who'd previously been able to load only two cars at a time.

Flush-with-floor, flush-with-door loading—Loading problems of this kind find quick, practical solution in the Magcoa flush Dockboard. Because the safety tread plate of the Dockboard does not rest on the car floor or threshold, loads can be spotted right to the very edge. Flush positioning at the car-end and rounded edge-beveling at the dock-end of the board assure maximum loading smoothness. Easily adjustable locking arrangement provides a snug, safe fit between dock and car. Because curb-ends do not extend beyond the car-threshold, there is maximum usable floor area for turning into and out of the car.

Light-weight, heavy-duty construction—Every Magcoa Dockboard is constructed of magnesium, the lightest of structural metals. Every Magcoa Dockboard has the patented hand holds, quarter-round safety curbs and other safety features which have made Magcoa Dockboards famous.

What's your loading problem? Are you bothered by spilling and damaging of loads? By a low rail dock? A low truck dock? A narrow, congested dock? Inefficient loading from ground level? Are you planning the dock for a new plant or warehouse? Modernizing an old dock? Switching to higher-capacity lift trucks or pallet trucks?

Whatever the loading problem, the odds are 1000 to 1 that your local Magcoa Representative has encountered it and solved it before.

Good Suggestion: Send for our free new bulletin, "What to do about Difficult Docks." It's loaded with practical, helpful ideas.

MAGNESIUM COMPANY OF AMERICA

MATERIALS HANDLING DIV.

EAST CHICAGO 1, INDIANA

Representatives in principal cities

magcoa

Produced in Canada by Magcoa Limited, 277 Kipling Ave. South, Toronto 14, Ontario. Phone: Clifford 1-1311

☐ Please send "Difficult Docks" bulletin

Name and Title_____

Company_____

Address_____

City-Zone-State_____

Copyright, 1955, Magnesium Company of America.

Circle No. 111 on Reader Service Card for more information

STOP PRODUCTION LINE HOLDUPS

. . . waiting for materials

It only lasted 20 minutes, but the company was robbed of better than $300 in production—simply because a fork lift truck couldn't be located to pick up and deliver some material the production line ran out of.

This sheer waste could have been prevented with Motorola Industrial 2-way radio. With radio, a central dispatcher knows where *every* materials handling truck is, and has complete control over them all, *every minute of the day*. Trucks can be radioed *directly* from job to job. By pre-planning the flow and using Motorola radio to coordinate all movements, efficiency has, in many cases, been stepped up as much as *90%*.

Emergency requests are handled *immediately* by shifting a truck from a routine assignment to the trouble spot—in seconds with a quick 2-way radio call.

Find out from Motorola, the pioneer and leader, how thousands of industrial firms are slashing materials handling costs and getting maximum use from their vehicles with 2-way radio. See how Motorola produces the *right* equipment for every job, with more exclusive features and *proved* to last longer. A Motorola Communications engineer will give you the facts and show you how a Motorola system pays for itself within *months*. Write, phone or wire TODAY!

MOTOROLA

INDUSTRIAL 2-WAY RADIO

MOTOROLA COMMUNICATIONS & ELECTRONICS, INC.
A SUBSIDIARY OF MOTOROLA, INC.
4501 AUGUSTA BOULEVARD • CHICAGO 51, ILLINOIS
ROGERS MAJESTIC ELECTRONICS LTD. TORONTO, CANADA

Motorola consistently supplies more mobile and portable radio than all others combined.
Proof of acceptance, experience and quality.
The only COMPLETE radio communications service—specialized engineering . . . product . . . customer service . . . parts . . . installation . . . maintenance . . . finance . . . lease.
"The best costs you less—specify Motorola."

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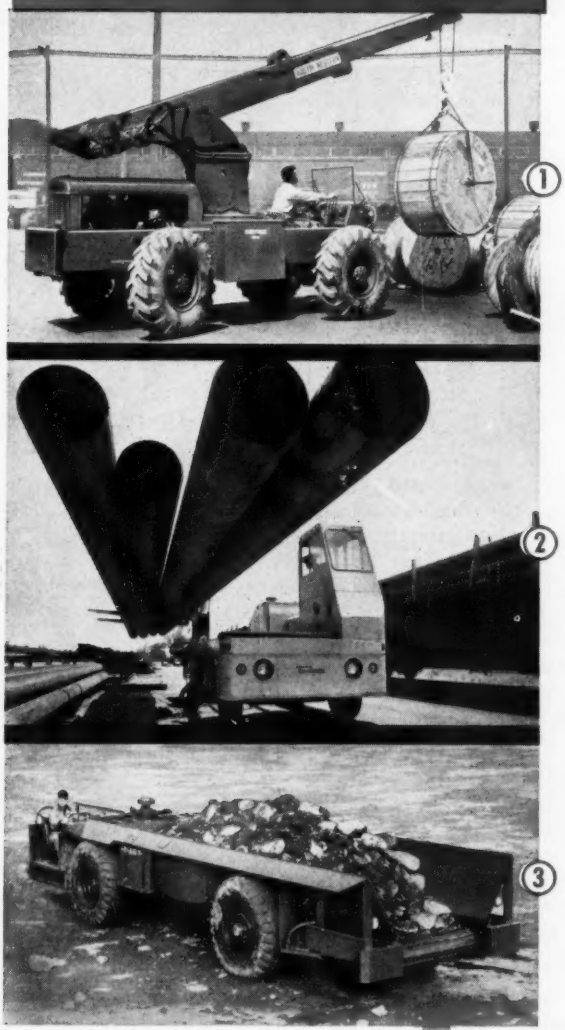
NEW VEHICLES
FOR
NEW PERFORMANCE



VICKERS®

HYDRAULIC SYSTEMS

for All Types of

MOBILE

EQUIPMENT

Vickers Hydraulic Systems make vital contributions to the efficient operation of an extremely wide range of vehicles. To the inherent advantages of hydraulic control, Vickers adds the benefits of a nation-wide and full time field engineering and service organization of unequaled experience. Vickers has the complete line of hydraulic equipment necessary to take undivided system responsibility . . . to eliminate any risk of incompatibility of hydraulic components. Ask for a copy of Bulletin M5101.

VICKERS INCORPORATED
DIVISION OF SPERRY RAND CORPORATION
1538 OAKMAN BLVD. • DETROIT 32, MICH.

Application Engineering Offices: • ATLANTA • CHICAGO • CINCINNATI • CLEVELAND • DETROIT • HOUSTON • LOS ANGELES AREA (El Segundo) • MINNEAPOLIS • NEW YORK AREA (Summit, N.J.) PHILADELPHIA AREA (Media) • PITTSBURGH AREA (Mt. Lebanon) PORTLAND, ORE. • ROCHESTER • ROCKFORD • SAN FRANCISCO AREA (Berkeley) • SEATTLE • ST. LOUIS • TULSA • WASHINGTON WORCESTER

IN CANADA: Vickers-Sperry of Canada, Ltd., Toronto

Engineers and Builders of Oil Hydraulic Equipment Since 1921

7354

① **AUSTIN-WESTERN HYDRAULIC CRANE**
In addition to power steering, Vickers Oil Hydraulics provide fast, smooth and positive (a) turntable rotation, (b) boom elevation, (c) raising and lowering of load, (d) extending and retracting of boom.

② **BAKER-RAULANG TRAVELOADER**
Vickers Hydraulics provides power steering and multiple movements that enable Traveloader to quickly reach out sideways and pick up a long load, place it on the vehicle's deck for traveling, and then stack it up to 12' high.

③ **DART UNDERGROUND TRUCK**
Vickers Hydraulics operates the reversible conveyor floor that permits fast and easy trim when loading, and then rapid dumping. Also has Vickers Hydraulic power steering for shuttle operation.

Circle No. 185 on Reader Service Card for more information

NEWS VIEWS TRENDS

INSTITUTE RELOCATES

The Electric Overhead Crane Institute has transferred its offices from New York City to Washington, D.C., and has named Joe H. Peritz as executive secretary. Peritz previously was associated with Lamson Corporation, and during the Korean emergency served as Chief of the Material Handling Equipment Branch in the National Production Authority.

PERMACEL UNIFIES SALES, WAREHOUSING

Three enlarged warehouses that combine sales and warehousing into a unified operation have been officially opened by Permacel Tape Corporation in Atlanta, Chicago and San Francisco. The new facilities are part of the tape manufacturer's national program to streamline customer service. According to Vice President George A. Fitzgerald, each warehouse has a larger capacity than its predecessor and is more conveniently located in each of the cities. New warehouses were previously opened in Dallas and Detroit, bringing the total to five for the year.

PARKDALE TAKES PRODUCT NAME

Increasing acceptance of Beam products has resulted in The Parkdale Company changing its name to Beam Products Manufacturing Company, effective January 1, 1956. No personnel or ownership changes are involved. Since the Beam trademark was introduced in 1936, manufacturing volume has outgrown several plants, necessitating a move into spacious new quarters in Los Angeles just a year ago. General Manager L. C. Zonker said that changing the company's name would result in easy identification of the firm with its LP-gas carburetion product.

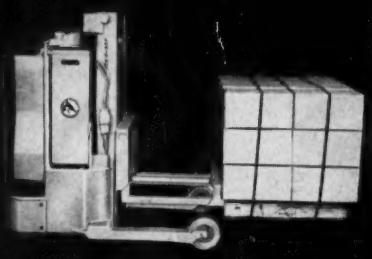
SYNTRON BECOMES SUBSIDIARY

Syntron Company is operating as a subsidiary of Link-Belt Company due to an exchange of stock between the firms. Link-Belt has a total of 18 plants and Syntron has three. In commenting on the merger, Robert C. Becherer, president of Link-Belt said, "The products of the two companies tend to supplement each other. Each company will be able to make substantial contributions to the other in management, production, distribution and research."

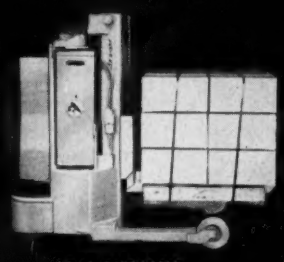
OSTER ENTERS M. H. FIELD

Oster Manufacturing Company, Cleveland, has entered the material handling field and is marketing on an international basis a line of mechanical and battery-operated portable elevators. For 62 years a manufacturer of pipe and bolt threading machines, Oster's decision to manufacture the lifts was based upon a three year study into new products and their market potential. It was brought about by a need to compensate for the economic peaks and valleys of machine tool demand and to provide a means for continuing multiple shift employment under all business conditions, according to President Roger Tewksbury. Industrial supply firms handling the company's present line will be the primary distributors of the new units.

New L-S HydraFork with extendible forks



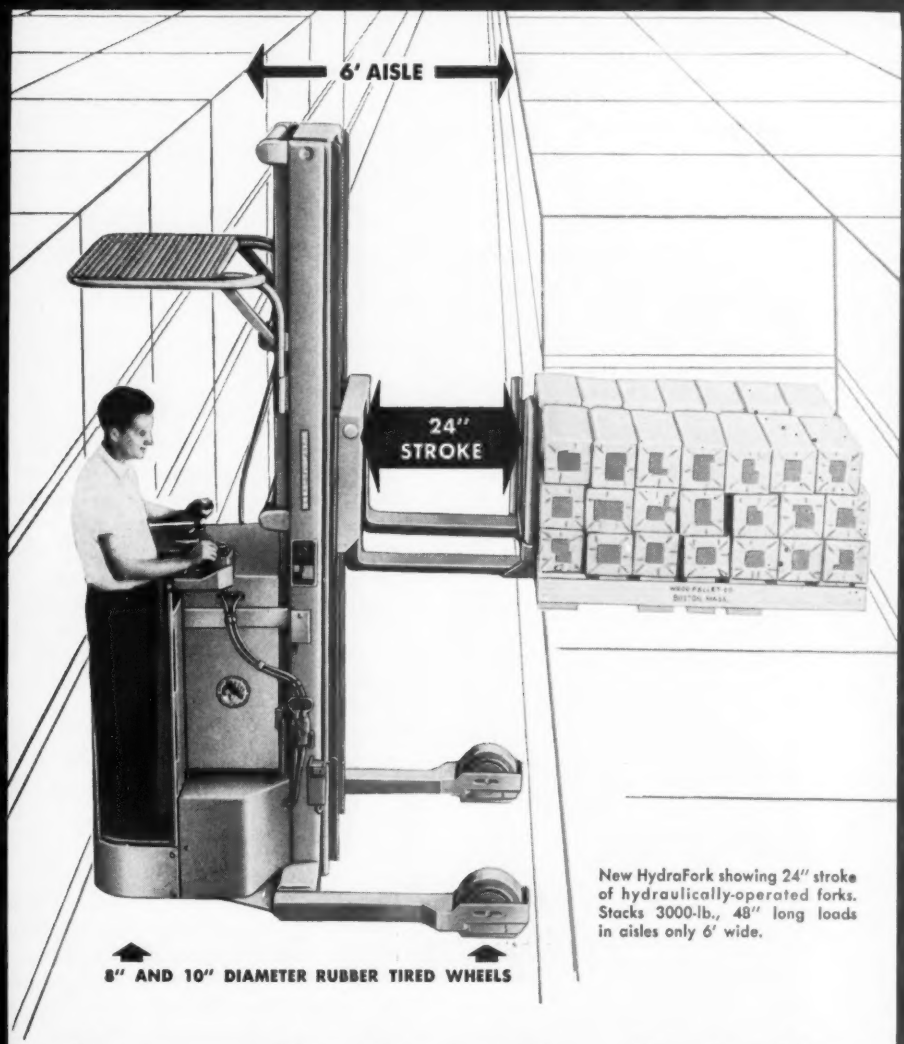
LOAD EXTENDED



LOAD RETRACTED

Want narrow aisles?
Want maximum floor protection?
Want to use your existing racks and pallets? . . .

You want a HydraFork!



New HydraFork showing 24" stroke of hydraulically-operated forks. Stacks 3000-lb., 48" long loads in aisles only 6' wide.

Gives you Maximum Floor Protection in Minimum (6') Aisles

Here's a narrow-aisle truck that does not straddle loads, consequently it can be equipped with large 10" diameter rubber-tired load wheels that are easy on your floors. To pick up a load, the operator simply positions the truck; extends the hydraulically-operated forks into the pallet; lifts; and retracts load into the truck. No aisle space is wasted for maneuvering when picking up or depositing loads.

And, the HydraFork has all the other exclusive Lewis-Shepard features which have made Lewis-Shepard trucks a symbol of quality across the country: "Lubricated-for-Life" design; Roller Masts, Magnetic Controls, Gear Drive, etc. Get full information on the HydraFork — available in "walkie" or riding types, with capacities to 3,000 lbs. It's the latest addition to the L-S Master Line, the only complete line of materials handling trucks on the market. Send for catalog. Use the coupon below.

RECENT REORDERS PROVE L-S DEPENDABILITY

Listed are typical reorders from blue chip companies in various industries:

Chemical Mfr.	has 52 L-S — reordered 3
Electrical Goods	has 255 L-S — reordered 3
Food Packer	has 70 L-S — reordered 2
Grocery Chain	has 57 L-S — reordered 3
Rubber Goods	has 57 L-S — reordered 4

MULTIPLY MAN-POWER LEWIS-SHEPARD

LEWIS-SHEPARD®

131 Walnut St., Watertown 72, Mass.

The Master Line

Please send catalog on ☐ L-S HydraFork ☐ L-S Master Line Trucks

Name.....

Company.....

Address.....

.....

Circle No. 102 on Reader Service Card for more information

Continued

CANTON STOKER BUYS WAGENER

Assets of Wagener Steam Pump Company, Canton, Ohio, have been purchased by Canton Stoker Corporation, and the 69 year old pump manufacturer will now be known as the Wagener-Schrader Pump Division. Production will continue in the Wagener plant until facilities are expanded to produce both lines at Canton Stoker.

BRIGHT OUTLOOK

1956 will be "a tremendous year for industry", if General Motors Corporation, whose material handling operations fall into eight separate groups, can be used as a criterion. According to a release from The Material Handling Institute, General Motors will place particular emphasis on the versatility of equipment purchased this year. G. E. McNeive, superintendent of material handling and production control at GMC Truck and Coach Division, and general chairman of the company's material handling activities in all plants during 1955, said that new equipment would be needed in order to keep pace with the advancement and improvement of material handling methods plus increased production in existing facilities. He said also that such advanced methods and equipment were working to upgrade and improve the position of the worker.

LOAD LUGGER MOVES NORTH

Ingersoll Kalamazoo Division of Borg-Warner Corporation, Kalamazoo, Michigan, is now engineering, manufacturing and marketing the Load Lugger line of truck bed hoists and bulk material containers. For years the equipment had been produced and sold by Brooks Equipment & Mfg. Co., Knoxville, Tennessee, which became a Borg-Warner subsidiary in March, 1955. J. H. Ingersoll and R. F. Schutz, president and manager of both companies until the Brooks title was dropped effective October 1, continue in those capacities with the Ingersoll Kalamazoo Division.

THE LAST FRONTIER

The 2nd Connecticut Material Handling Exposition will be held March 28-29 in the New Haven Arena and will feature a fork truck rodeo. Drivers from more than 150 industrial plants throughout the state of Connecticut will compete in an obstacle course for prizes and awards. Slogan of the show, first to be held since 1952, will be, "Last Frontier for Cost Reduction".

NEW ASSOCIATION

A new trade group has been formed by the manufacturers of electric industrial and golf cars. Purpose of the organization, to be known as the Electric Car Manufacturers Association, is to establish a meeting ground to discuss common industry problems and experiences and to interchange ideas and suggestions. Officers elected were: President W. C. Coleman, Mid Empire Corporation; Vice Presidents J. H. Carrier, Cushman Motor Works, Inc. and N. A. Saigh, Electric Carrier Corporation; Secretary M. J. Zurowski, Mid Empire Corporation; and Treasurer A. C. Buehler, Jr., Victor Adding Machine Co., Electri-Car Division.

Mobilift's flexibility in handling motors, compressors, dies, tools and even 20 ft. lengths of steel rods makes it the number one choice at Quiet-Heet Manufacturing Corporation.

One Mobilift with extended forks unloads masonite, lumber and plywood . . . paid for itself in only nine months at Igloo Cabinet Co.

PROVEN EFFICIENCY and ECONOMY MAKE MOBILIFT® THE FIRST CHOICE

Prove for yourself how in any industry . . . any application . . . a Mobilift Fork Truck can lower operating cost . . . reduce man-hours per job . . . cut maintenance to a minimum.

Only Mobilift gives you high free lift at no extra cost . . . Mobil-Matic* Drive . . . fingertip controls. You can convert Mobilift to LP gas operation . . . and add attachments for specialized jobs. Mobilift "Stand-Up End Control" and "Sit-Down" models range from 2000 to 5000 lbs. capacities.

FREE TO YOU

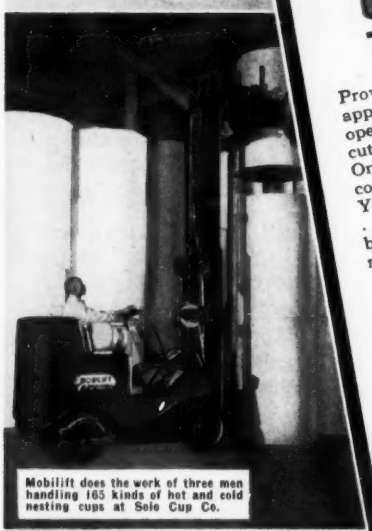
Why not write today for all the facts on Mobilift installations in your industry plus . . .

- Mobilift "Sit-Down" Folder on Hydra-Lizer* . . . Double Frame Construction and many other exclusive features that save dollars . . . increase operating efficiency.
- Mobilift "Stand-Up" Folder which shows you why Mobilift is the lowest cost gas-operated truck on the market.

*Trade Mark

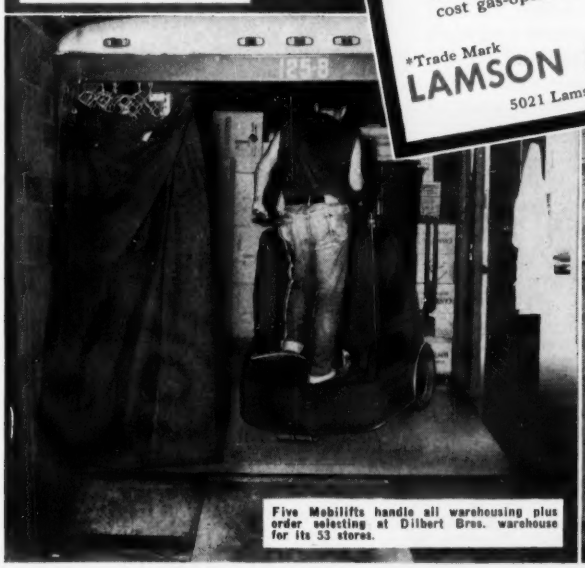
LAMSON MOBILIFT CORP.

5021 Lamson Street, Syracuse 1, N. Y.



Mobilift does the work of three men handling 165 kinds of hot and cold nesting cups at Sole Cup Co.

A Mobilift reduced highway truck loading time from 15 to 5 man-hours at M. M. Stevenson & Co.



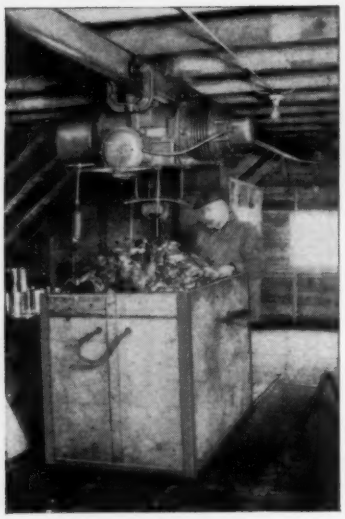
Five Mobilifts handle all warehousing plus order selecting at Dilbert Bros. warehouse for its 53 stores.

Mobilift LP gas-operated trucks save Burry Biscuit Corp. $980 per truck per year based on an average 17 hour day, operating five or six days a week.

Mobilift Sales and Service is Available in 75 Cities Throughout the U.S. and Canada

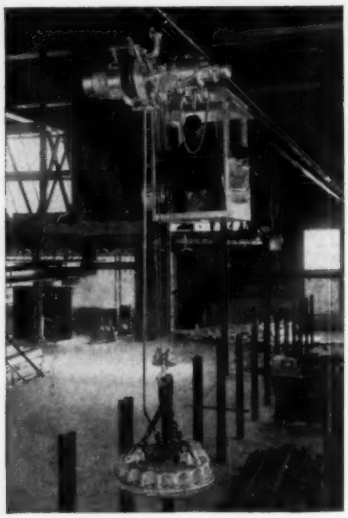
Circle No. 108 on Reader Service Card for more information

WHICH HOIST fits your plant's needs?



SHEPARD NILES
FLOOR-OPERATED HOIST

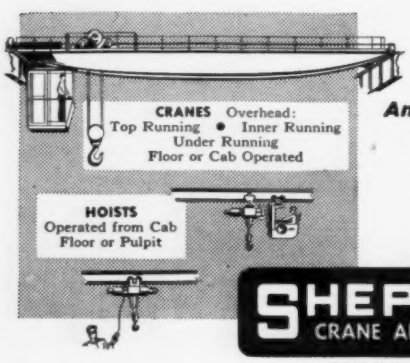
Operator primarily occupied with other duties. Uses hoist for fast, efficient handling of relatively short hauls.



SHEPARD NILES
CAB-OPERATED HOIST

Operator in cab moves loads along at high speeds, occupies best vantage point for spotting and stacking material.

THE RIGHT HOIST . . . can reduce your plant's handling costs. But which one is best for the job . . . a floor-operated hoist where the operator is freed for other duties or a cab-operated hoist where he is engaged fulltime moving loads through the air? Because Shepard Niles manufactures both types of hoists . . . as well as a complete line of cranes . . . we can approach your handling problem with an open mind.



● Send for Bulletins describing Shepard Niles Cab and Floor-Operated Hoists. And request our representative to call.

America's Most Complete Line

of Cranes and Hoists

Since 1903

SHEPARD NILES
CRANE AND HOIST CORPORATION

2772 Schuyler Ave., Montour Falls, N.Y.

Circle No. 163 on Reader Service Card for more information

news from the SALES FIELD

Wisconsin Motor Corporation has named **Tom Barrett** as assistant to Sales Manager **Ray J. Fellows.** For the past seven years Barrett has served as sales representative, and in his new position will team-up with Assistant Sales Manager **Will Perschbacher** to promote sales and distribution of the company's products.

Tom Barrett

Engineering, sales and service on the complete Rapistan line of equipment is offered by the recently formed **Rapistan of Indiana, Inc. Forrest L. Scott** is president of the new corporation located at 5162 N. College Avenue, Indianapolis. The sales force includes **James G. McCollam, James S. Gilson** and R. R. Scott.

Promotion of **Roy E. Mullin** to the newly created position of general sales manager of **Napco Industries, Inc.** has been announced by President **Max Rappaport.**

Lamson Mcbilift Corporation has appointed the following new dealers: **Modern Handling Company, Inc.,** Indianapolis; **Dechert Machine Shop, Inc.,** Palmyra, Pa.; **Reagan Equipment Company,** New Orleans, La. and Natchez, Miss.; **Bigelow Robinson Company,** Little Rock; **Stanly**

Handling Equipment Company, Agawam, Mass.; and **F. H. Ross & Company,** Charlotte, which will distribute through six branches in South Carolina, Georgia and northern Florida.

J. W. Kelly

J. William Kelly was appointed sales manager of the Electric Truck Section of **Clark Equipment Company's** Industrial Truck Division. For the past nine years he has been associated with the Exide Industrial Division of Electric Storage Battery Company where he most recently served as sales manager of the Boston branch.

New sales manager of **Gar Wood Industries, Inc., Findlay Division,** is **Harold C. Clark** who has served in several sales management capacities since joining the firm in 1952. In his new position he will direct sales activities for the Buckeye line of equipment.

The Jeffrey Manufacturing Company has appointed **Chester G. Hawley** general manager of sales for the Industrial Division, succeeding the late Lincoln Kilbourne. Hawley formerly managed the O.E.M. sales department, and during 1952 served a term as Chief of the Conveyor Section of the National Production Authority in Washington.

Completion of 35 years of service with **Goodyear Tire & Rubber Company** was noted by **Ezra W. Goewey,** manager of sales training, who was honored with a pin presented by Vice President **Walter A. Hazlett.** Goewey has been associated with sales during all his

Model 606

NEW KIND OF POWER SWEEPER

Engineered to outlast—powered to outperform all others

"Filter-Vac Dust Control"— NO DUST BAG TO EMPTY! Fan deposits dust in main hopper automatically. (Pat. Pending)

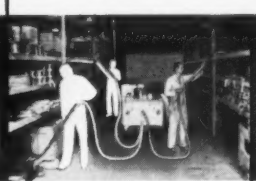
Reach-Easy Controls: No loss of sweeping time—all levers can be operated by the driver while he is seated.

Forget old ideas about power sweepers! The new Wayne is designed with engineering principles never before used in a power sweeper except for heavy duty street sweepers also built by Wayne. This new Wayne really sweeps over 100,000 square feet per hour. And it sweeps better!

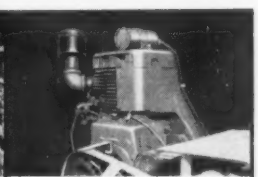
New exclusive Wayne features include: More functional design, larger hopper capacity, welded all-steel body, safety shielding of moving parts, automotive type steering, and Power-Flex lift action—features that will prove their plus value instantly on *demonstration in your plant!* 4 sizes for every sweeping need.

THERE'S A SIZE SWEEPER FOR EVERY SWEEPING JOB. LP GAS POWERED ENGINES AVAILABLE FOR ALL MODELS

Power Dumping, hydraulically operated while driver is seated.



Vacuum Attachment available for cleaning shelves, bins, equipment.



Extra Power. Model 606 has about twice the horsepower of any other sweeper.

WAYNE

Write for literature or on-the-job demonstration

WAYNE MANUFACTURING CO.
1214 E. Lexington St. • Pomona, Calif.

☐ Please send me literature regarding new Wayne Power Sweepers.
☐ Please arrange for demonstration.

Name_____
Title_____
Company_____
Address_____
City_____ Zone____ State_____

World's Largest Producer of Power Sweepers for Cities and Industry

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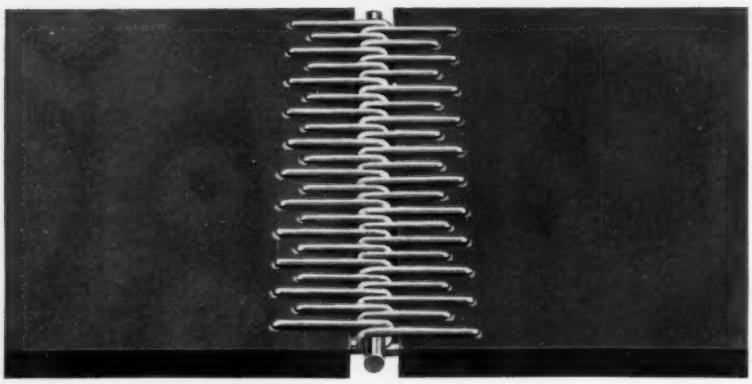
the fastest way to make ends meet

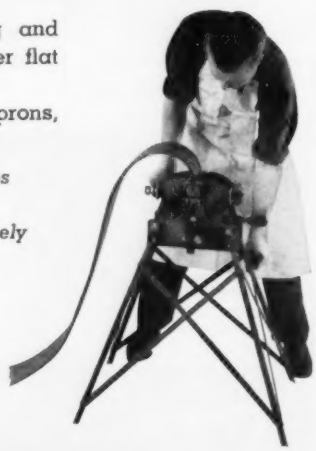


Clipper

HOOKS and LACERS

in materials handling, food harvesting and processing, power transmission, wherever flat ends must be joined.
Clipper belt lacing equipment for belts, aprons, tapes and ribbons!

- *produces secure, flexible joints in minutes*
- *does not injure belting*
- *gives smooth, flexible joint that rides freely over conveyor rollers*
- *is flexible both ways of the belt*



WRITE FOR FREE SAMPLE

Send a sample of your belting, apron or ribbon to Clipper with an outline of your problem. They'll determine the best method of fastening and then lace your sample FREE.

Ask your Industrial Distributor for Clipper Products

Clipper BELT LACER COMPANY

990 Front Ave., N. W., Grand Rapids 2, Michigan

Circle No. 50 on Reader Service Card for more information

years with the company, the greater portion of which were spent in the Albany, N. Y. and Des Moines, Iowa, sales districts.

G. O. Britton has been named manager of distributor sales by **American Hoist & Derrick Company.** His experience includes the general sales managership of Schield Bantam Company and domestic sales managership of Athey Products Company. Britton's appointment is said to be part of a planned overall expanded program of merchandising by American Hoist in the construction and related fields.

G. O. Britton

Martin-Decker Corp. has appointed **Air-Mac, Inc.,** Seattle, exclusive distributor of its products in Washington, Oregon, Montana and northern Idaho. The firm maintains branch offices in Spokane, Tacoma, Portland, Eugene and Yakima.

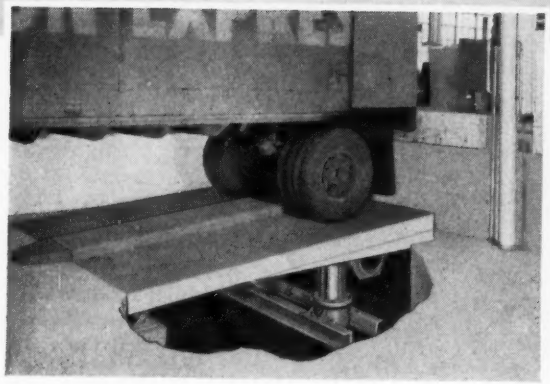
The Cleveland Vibrator Company has appointed **Gilbert R. Stocum** as sales engineer for the state of Illinois. He will operate from offices located at 7333 North Ridge Avenue, Chicago.

Recent distributor appointments of **The Buda Division, Allis-Chalmers Manufacturing Company,** include: **California Industrial Trucks,** 501 Standish Street, Redwood City, Calif.; **W. J. Motsett, Inc.,**

Circle No. 157 on Reader Service Card

Loading needs automation, too!

ONE OF THESE ROTARY OILDRAULIC® DEVICES
WILL SLASH COSTS, TIME AND LABOR FOR YOU



Rotary TRUCK LEVELER

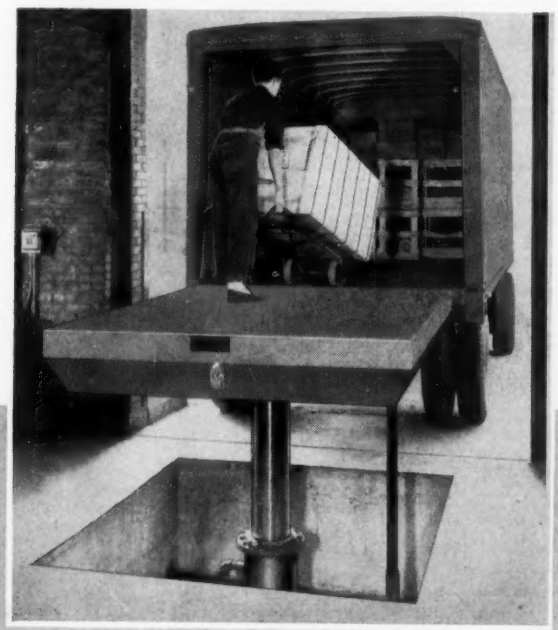
Saves space . . . handles any highway carrier

- Hydraulic jacks raise or lower trailer to dock level for fastest loading and unloading.
- Easily installed in pavement in front of loading dock . . . takes up no space.
- 40,000-lb. capacity, 28" travel . . . handles any carrier at any loading dock.
- Dependable, economical hydraulic operation by Rotary Oildraulic electric power unit.

Rotary LEVA-DOCK® RAMP

Speeds loading dock traffic

- Hinged self-leveling ramp saves time, reduces breakage, increases safety.
- Moves up or down automatically to stay level with the truck or trailer bed.
- Compensates for varying truck bed heights.
- Supported by Rotary Oildraulic jack with low-cost electric power unit or compressed air operation.



Rotary LEVELATOR® LIFT

Permits loading direct from plant floor level

- Lifts heavy loads from plant floor to trucks, freight cars or different building levels.
- Eliminates dock expense . . . buildings can be erected on grade.
- Platform is level with floor when lowered and can be trucked over.
- Capacities to 100,000 lbs. . . . oil-hydraulic operation with electric power unit or compressed air.

ROTARY LIFT COMPANY, MEMPHIS 2, TENNESSEE
Specialists in oil-hydraulic lifting devices

Mail coupon for complete data

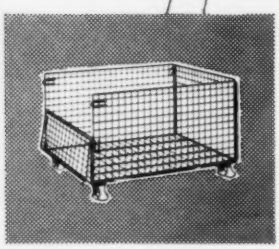
ROTARY LIFT CO.
1162 Kentucky, Memphis 2, Tenn.
Send information on:
( )Truck Levelers;( )Leva-Dock Ramp;
( )Levelator Lift.
Name_____
Address_____

USP Warehouse Palletainers cut inventory costs. Contents are always visible for rapid inventory. Hinged front section permits easy access, even when units are stacked. *Anything* contained by a 2" mesh can be stored more quickly and safely in Palletainers.

Serving industry everywhere!

Warehousing small parts in large quantities? USP Palletainers are the most practical, economical solution for achieving better space utilization plus efficient handling.

Specifically . . . USP Palletainers of the *warehouse* type offer you amazing versatilities for maintaining warehouse stocks conveniently — with contents always visible for fast, easy selection—plus savings in space—complete stacking safety, ease of transport and shipping. All these, plus the 75% storage space savings made possible by the *exclusive* "flat-fold" feature.



USP Warehouse type Palletainer features the half-drop end gate for easy access. 2,000 to 4,000 lb capacities.

USP Palletainers have eliminated the guesswork from warehouse parts handling and storage operation. See for yourself how easily they will solve your problems.

UNION STEEL PRODUCTS CO., Albion, Michigan

USP PALLETAINERS

GENTLEMEN:
Please send me complete information on USP Palletainer application.

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

☐ **Please have one of your materials handling engineers contact me at once.**

Circle No. 182 on Reader Service Card for more information

SALES FIELD

Continued

Peoria, Ill.; and **Frank L. Young Company,** Omaha.

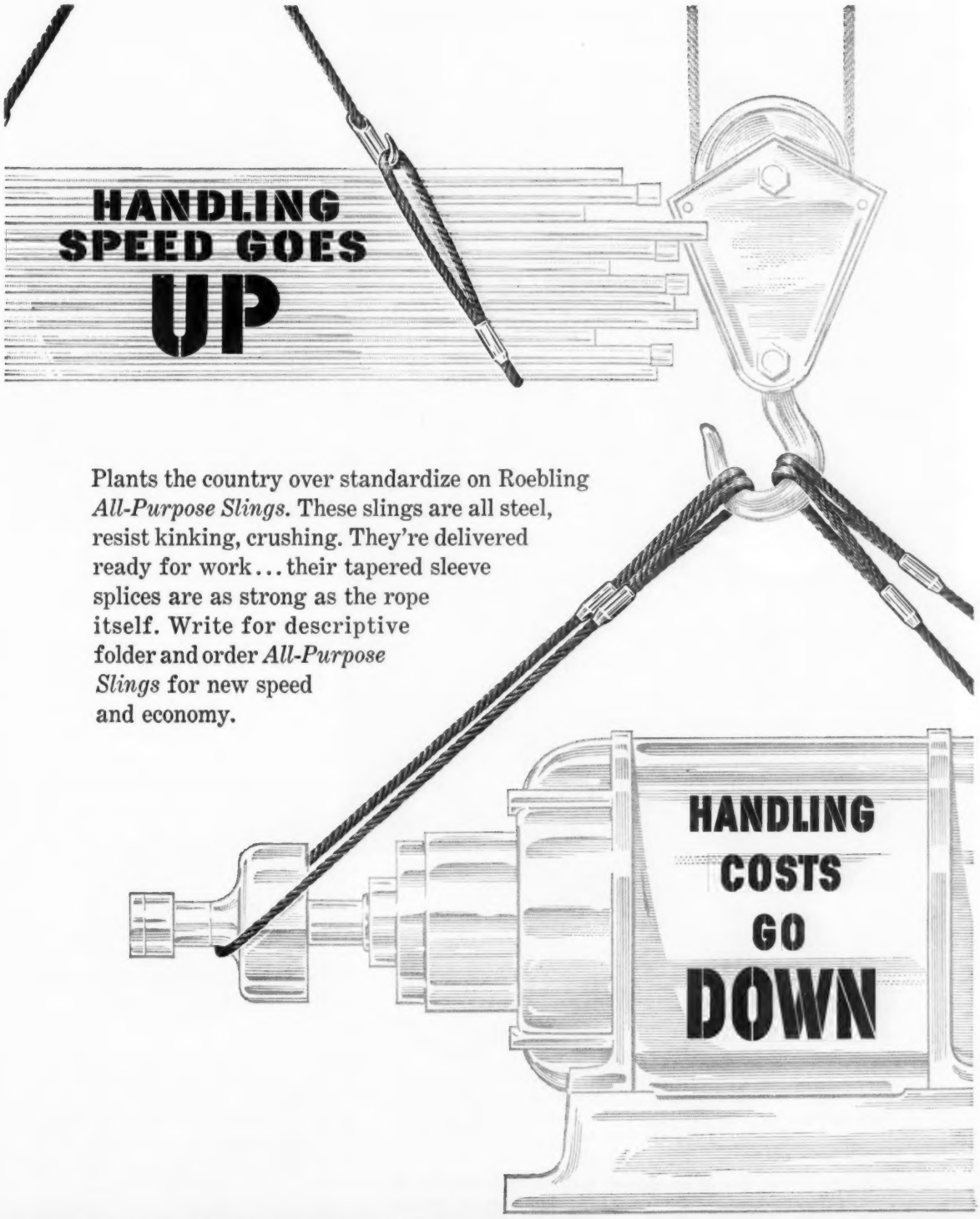
D. D. Chene heads the new regional office of **Chrysler Corporation's Marine** and **Industrial Engine Division** in Houston, Texas. The office is located at 1110 Holcomb, 713 Prudential Building.

Exclusive Indianapolis representative of **Thomas Truck and Caster Co.** is **Martin and Brown,** 3338 North Illinois Street.

The Powell Pressed Steel Company has announced the following distributor appointments: **Equipment for Industry,** Cleveland; **Crunkleton Co.,** Charleston, W. Va.; **Kimball Industrial Sales,** South Bend, Ind., and **Pond Liftruck Co.,** Birmingham, Ala.

Erie Equipment Company, representative of **Towmotor Corporation** in Cleveland, opened a new sales, parts and service branch in Hubbard, Ohio, on December 1. Located at 640 West Liberty Street, the new outlet will service the counties of Trumbull, Mahoning and Columbiana in Ohio and Mercer and Lawrence in Pennsylvania. The service department is headed by William C. "Bill" Denton, who was associated with the Towmotor factory service deparment for many years.

Opening of a new district office in Birmingham, Alabama, has been announced by



Plants the country over standardize on Roebling *All-Purpose Slings*. These slings are all steel, resist kinking, crushing. They're delivered ready for work... their tapered sleeve splices are as strong as the rope itself. Write for descriptive folder and order *All-Purpose Slings* for new speed and economy.

ROEBLING

Subsidiary of The Colorado Fuel and Iron Corporation

JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J. BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13325 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK 6, N. Y.

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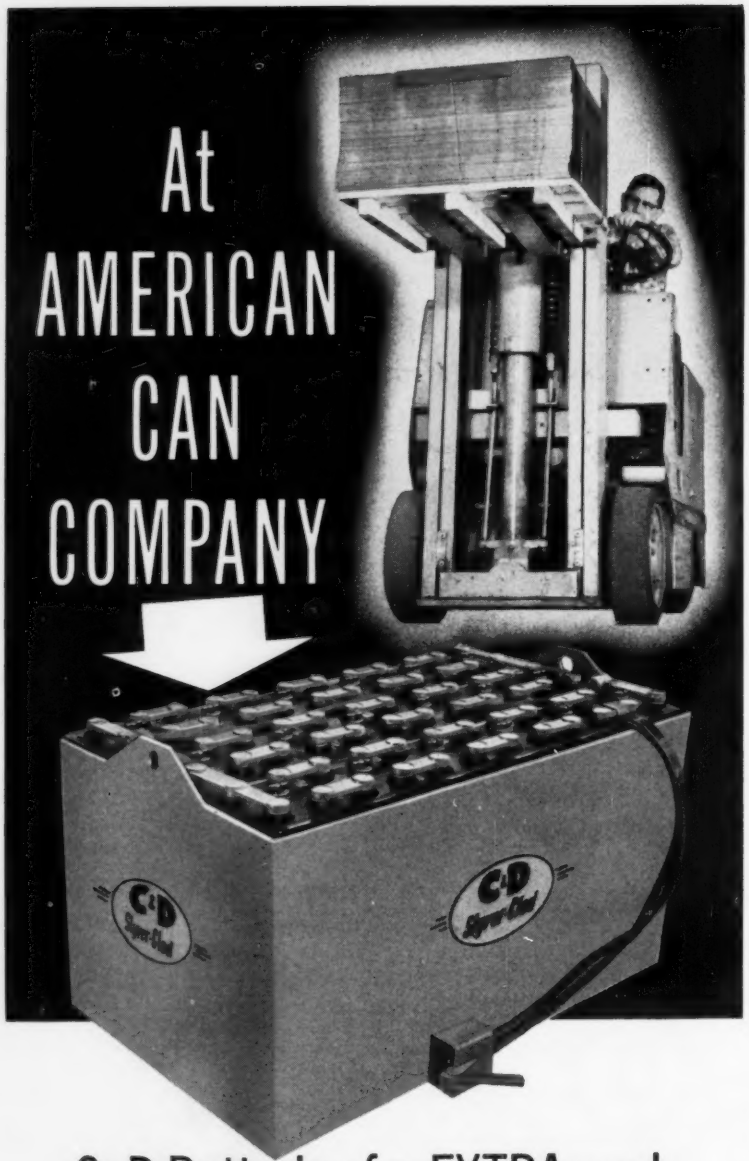


C&D Batteries for EXTRA work

The American Can Company has played a major part in virtually every important development in the can and container industry. American Can developed equipment is responsible for high-speed production which produces millions of cans in a single day. To help solve their material handling problems, the American Can Company uses C & D Slyver-Clad* batteries as one of their sources of power for the industrial trucks used in daily operations.

C & D Slyver-Clad batteries are approved as standard equipment by all electrical truck manufacturers. For further information, write for Catalogs.

*T. M. Reg.

C&D BATTERIES, INC.
of Conshohocken, Pa. | Attica, Indiana
Industrial Batteries since 1906
SALES AND SERVICE OFFICES IN PRINCIPAL CITIES FROM COAST TO COAST

Circle No. 36 on Reader Service Card for more information

Century Electric Company. N. Cardella, formerly of the Atlanta branch office, heads the new facility located at 831 North 19th Street. The office will serve as a stocking point for customers through Alabama and parts of Tennessee and Florida.

Two men have been named to new positions at **The Electric Storage Battery Company, Exide Industrial Division. Evans Taylor,** former Philadelphia branch sales engineer, has been named manager—sales engineering to succeed **E. J. Fitzmaurice, Jr.,** who has been appointed Boston branch sales manager. Taylor joined the company in 1936. Fitzmaurice in 1941. Both men have served as battery consultants to the Armed Services.

Jakes Foundry Company has appointed **Equipment for Industry,** Cleveland, as an exclusive distributor.

Harvey Bertrum Wilgus has been named general sales manager of **The Electric Products Company.**

Richard W. Pratt has retired as sales office manager of **Automatic Transportation Company.** Succeeding him is **Bruce Younker** who joined the company in 1952 as a sales correspondent.

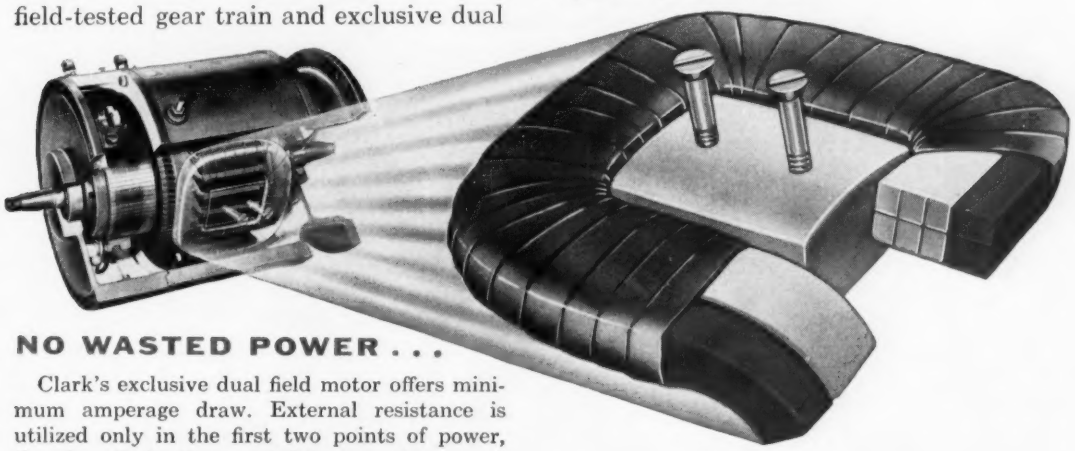
Hyster Company has promoted **Harold R. Lucas** to the position of manager of a new Merchandise Division of the General Sales Department.

Efficient fume-free Clark Electric stacks chromic acid 3 high at Globe Chemical Co., Cincinnati, Ohio

CLARK ELECTRICS

work a longer cycle . . . do more work!

There just isn't any other power type that can move material at a lower cost per ton-mile than a Clark Electric. Clark's field-tested gear train and exclusive dual field, high torque motor provide maximum efficiency under the most severe operating conditions.



NO WASTED POWER . . .

Clark's exclusive dual field motor offers minimum amperage draw. External resistance is utilized only in the first two points of power, thereby eliminating wasteful power losses and overheating. Result! Your battery works a longer cycle . . . your equipment does more work.

At 4th point of power Clark's exclusive *dual field construction* is achieved by eliminating half the field resistance (indicated in red).

Write for the booklet "Electri-Facts" showing cutaways of the power train, control circuit, hydraulic system, and other important components.

Industrial Truck Division
CLARK EQUIPMENT COMPANY
Battle Creek 13, Michigan

CLARK® EQUIPMENT

DON'T MISS THE MATERIAL HANDLING SHOW, JUNE 5-8, CLEVELAND, OHIO!

Circle No. 43 on Reader Service Card for more information

CATALOGS

offered in

Marking Equipment . . . New catalog from Industrial Marking Equipment Company, Inc. gives full information on marking equipment for production line marking, dating and coding.

Circle 92 on Reader Service Card

Package Conveyors . . . Catalog from A. B. Farquhar Division, The Oliver Corporation, gives facts on package conveyors.

Circle 67 on Reader Service Card

Cranes . . . Descriptive literature published by Coles Cranes Incorporated tells how Coles cranes give precision lifting with mobility.

Circle 45 on Reader Service Card

Casters . . . Bulletin 157-3G offered by Faultless Caster Corporation tells how grease sealed casters protect products and costs.

Circle 68 on Reader Service Card

Electric Fork Trucks . . . The Elwell-Parker Electric Co. has available a new condensed catalog that gives facts about electric fork trucks.

Circle 61 on Reader Service Card

Cranes-Excavators . . . The perfect machine for high-speed loading and unloading is described in literature offered by Schield Bantam Company.

Circle 164 on Reader Service Card

Wheelbarrows . . . Sterling Wheelbarrow Company offers data on what is said to be man's easiest method of handling.

Circle 172 on Reader Service Card

Processing Belts . . . If your production costs are higher than they ought to be, the Cyclone Fence Department, American Steel & Wire Division, United States Steel Corp., offers literature on how you can improve your profit picture.

Circle 16 on Reader Service Card

Steel Strapping . . . Six basic unitizing methods are described in a brochure available from Signode Steel Strapping Company.

Circle 165 on Reader Service Card

Hoists . . . JC hoist bulletin from Robbins & Myers, Inc. tells why you get more value for the same money with the R&M JC.

Circle 154 on Reader Service Card

Dockboards . . . Magnesium Company of America offers details on how to solve difficult dock-problems.

Circle 111 on Reader Service Card

High Lift Rider . . . John Morrell Mfg. Co. discusses the engineering, low weight and low cost features of the MorLift truck.

Circle 124 on Reader Service Card

Paper Pallets . . . Descriptive folder on how to halve handling costs is available from American Cyanamid Co., Paper Chemicals Dept.

Circle 21 on Reader Service Card

Scales . . . Illustrated catalog from W. C. Dillon & Co., Inc. tells how to systematize scrap salvage.

Circle 59 on Reader Service Card

High Lift Walkie . . . Exclusive features of the HydroLectric truck are pointed out in data offered by Lift Trucks, Inc.

Circle 103 on Reader Service Card

Sweepers . . . Wayne Manufacturing Company tells about a new kind of power sweeper engineered to outlast, powered to outperform all others.

Circle 189 on Reader Service Card

Tow Trucks . . . Jakes Foundry Company offers literature on Safe-Tow conveyor trucks designed to save valuable man hours in any warehouse.

Circle 94 on Reader Service Card

Stitcher . . . Plus features of the Young Conqueror wire stitcher are pointed out by Diagraph-Bradley Industries Inc.

Circle 56 on Reader Service Card

Hydraulic Tables . . . Lange-Lift Co. says its hydraulic table has hundreds of time-saving uses.

Circle 100 on Reader Service Card

and BULLETINS

advertisements in this publication

Dock Covers . . . Literature from Capco tells how to get year 'round protection for loading and unloading between car and building doorways.

Circle 38 on Reader Service Card

Pumps . . . Literature from Tokheim Corporation, General Products Division, tells how to speed work, prevent accidents and stop waste of liquid products.

Circle 176 on Reader Service Card

Hoppers . . . Roura Iron Works, Inc. has available facts on self-dumping hoppers designed to cut costs.

Circle 158 on Reader Service Card

Yard Cranes . . . Bulletin 73C published by Silent Hoist & Crane Co. tells how the Karri-Go carries bigger loads and cuts down travel trips to save time and money in yard handling.

Circle 166 on Reader Service Card

Retaining Papers . . . How Thilco unitized loading methods reduce breakage of bagged, canned or bottled goods is described in a catalog offered by Thilmany Pulp & Paper Company.

Circle 181 on Reader Service Card

Drum Attachment . . . Data from Walz & Krenzer, Inc. tells how to lift, transport and stack drums quickly and safely.

Circle 188 on Reader Service Card

Tape Dispenser . . . Seal-O-matic Dispenser Corporation describes a tape dispenser that saves time and money and offers a 10 day free trial.

Circle 160 on Reader Service Card

Batteries . . . Booklet 749 published by Gould-National Batteries, Inc. gives the full story of Gould research.

Circle 76 on Reader Service Card

Loading Ramps . . . The secret of its adjustable loading ramps is precision counterbalancing, says data from Rite-Hite Division, Loomis Machine Company.

Circle 105 on Reader Service Card

Gravity Shelving . . . Details on how Quik-Pik rear feed gravity shelving can be applied to order picking of items of many types, shapes and sizes are available from North American Equipment Corporation.

Circle 137 on Reader Service Card

High Lift Rider . . . Catalog from Lewis-Shepard Products Inc. tells about the HydraFork truck that gives maximum floor protection in minimum aisles.

Circle 102 on Reader Service Card

Tractor Shovel . . . Data on the new model HAH one-cubic yard tractor shovel is offered by The Frank G. Hough Company.

Circle 85 on Reader Service Card

Air Hoists . . . Production air hoists to fit any job from 100- to 2000-pounds are described in data available from The Aro Equipment Corporation.

Circle 8 on Reader Service Card

Floor Cranes . . . Anything you can hang on a hook can be easily handled by a Ruger crane, says literature from Ruger Crane Company.

Circle 159 on Reader Service Card

Parts Baskets . . . Bulletin MS-52 published by Wire & Iron Products, Inc. describes various sizes and capacities of baskets for handling parts.

Circle 195 on Reader Service Card

Box & Bag Truck . . . New 1956 catalog from Dico describes the new model B combination box and bag truck.

Circle 55 on Reader Service Card

Bag Closing Machines . . . Union Special Machine Company's bulletin 200 describes bag closing machines designed to lower production costs.

Circle 184 on Reader Service Card

Conveyors . . . Exclusive design features of its portable conveyors are pointed out in illustrated catalog by The E. W. Buschman Company.

Circle 33 on Reader Service Card

Use This

READER SERVICE CARD

to obtain information on any item in this issue

New Equipment & Supplies ..... Starting on Page 147
Useful Literature ..... Starting on Page 140

PLEASE PRINT **JANUARY, 1956. Do not use after 4-15-56**

Name ..... Position .....

Company ..... Kind of Business .....

Street .....

City ..... Zone..... State.....

PLEASE SEND ME ADDITIONAL INFORMATION AND LITERATURE ON ITEMS CIRCLED BELOW.

1	18	35	52	69	86	103	120	137	154	171	188	205	222	239	256	273	290	307	324
2	19	36	53	70	87	104	121	138	155	172	189	206	223	240	257	274	291	308	325
3	20	37	54	71	88	105	122	139	156	173	190	207	224	241	258	275	292	309	326
4	21	38	55	72	89	106	123	140	157	174	191	208	225	242	259	276	293	310	327
5	22	39	56	73	90	107	124	141	158	175	192	209	226	243	260	277	294	311	328
6	23	40	57	74	91	108	125	142	159	176	193	210	227	244	261	278	295	312	329
7	24	41	58	75	92	109	126	143	160	177	194	211	228	245	262	279	296	313	330
8	25	42	59	76	93	110	127	144	161	178	195	212	229	246	263	280	297	314	331
9	26	43	60	77	94	111	128	145	162	179	196	213	230	247	264	281	298	315	332
10	27	44	61	78	95	112	129	146	163	180	197	214	231	248	265	282	299	316	333
11	28	45	62	79	96	113	130	147	164	181	198	215	232	249	266	283	300	317	334
12	29	46	63	80	97	114	131	148	165	182	199	216	233	250	267	284	301	318	335
13	30	47	64	81	98	115	132	149	166	183	200	217	234	251	268	285	302	319	336
14	31	48	65	82	99	116	133	150	167	184	201	218	235	252	269	286	303	320	337
15	32	49	66	83	100	117	134	151	168	185	202	219	236	253	270	287	304	321	338
16	33	50	67	84	101	118	135	152	169	186	203	220	237	254	271	288	305	322	339
17	34	51	68	85	102	119	136	153	170	187	204	221	238	255	272	289	306	323	340

FIRST CLASS
PERMIT No. 8066
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CLEVELAND, OHIO

BUSINESS REPLY CARD
NO POSTAGE STAMP NECESSARY IF MAILED IN THE UNITED STATES

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1240 ONTARIO STREET CLEVELAND 13, OHIO

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1240 ONTARIO STREET CLEVELAND 13, OHIO

PLEASE PRINT JANUARY, 1956. Do not use after 4-15-56

Name ..... Position .....

Company ..... Kind of Business .....

Street .....

City ..... Zone..... State.....

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4	21	38	55	72	89	106	123	140	157	174	191	208	225	242	259	276	293	310	327
5	22	39	56	73	90	107	124	141	158	175	192	209	226	243	260	277	294	311	328
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7	24	41	58	75	92	109	126	143	160	177	194	211	228	245	262	279	296	313	330
8	25	42	59	76	93	110	127	144	161	178	195	212	229	246	263	280	297	314	331
9	26	43	60	77	94	111	128	145	162	179	196	213	230	247	264	281	298	315	332
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11	28	45	62	79	96	113	130	147	164	181	198	215	232	249	266	283	300	317	334
12	29	46	63	80	97	114	131	148	165	182	199	216	233	250	267	284	301	318	335
13	30	47	64	81	98	115	132	149	166	183	200	217	234	251	268	285	302	319	336
14	31	48	65	82	99	116	133	150	167	184	201	218	235	252	269	286	303	320	337
15	32	49	66	83	100	117	134	151	168	185	202	219	236	253	270	287	304	321	338
16	33	50	67	84	101	118	135	152	169	186	203	220	237	254	271	288	305	322	339
17	34	51	68	85	102	119	136	153	170	187	204	221	238	255	272	289	306	323	340

CATALOGS AND BULLETINS

Continued

Shelving . . . Bulletin 701 published by The Frick-Gallagher Mfg. Co. tells about Klip-Bilt steel shelving that combines high strength with low installation cost.

Circle 69 on Reader Service Card

Warehouse Trucks . . . Time, money and effort can be saved when you use its precision-built factory trucks, according to literature from The Colson Corp.

Circle 46 on Reader Service Card

Electric Tiering Trucks . . . How you can store up to 50 percent more in your warehouse is outlined in data available from The Raymond Corporation.

Circle 145 on Reader Service Card

Pulsating Panels . . . Gerotor May Corporation offers details on PneuBin pulsating panels designed for safe, efficient, mechanical material flow.

Circle 71 on Reader Service Card

Portable Elevators . . . The American Pulley Company has available data on 23 various models of portable elevators, said to require less manpower because they offer more hydraulic power.

Circle 22 on Reader Service Card

Car Door Opener . . . Literature from The Nolan Company tells about a one-man door opener that opens any box car door in 20 seconds or less.

Circle 134 on Reader Service Card

Pallet Trucks . . . Trucks that answer every pallet handling need are described in data available from Rack Hydraulic Equipment Corporation.

Circle 148 on Reader Service Card

Belt Conveyors . . . Bulletin available from Conveyor Specialty Company Inc. gives facts about the Unitable belt conveyor for assembly, inspection and packaging.

Circle 51 on Reader Service Card

Racks . . . American Metal Products Co., Storage Rack Division, offers a catalog on storage racks that may be erected without bolting or welding.

Circle 14 on Reader Service Card

Fibre Drums . . . Literature from Continental Can Company tells how many industries are solving shipping problems with low-cost fibre drums.

Circle 44 on Reader Service Card

Shelving . . . Bulletin 2057 published by Hallowell Shop Equipment Division, Standard Pressed Steel Company, tells how to select and use adjustable shelving.

Circle 175 on Reader Service Card

Pallet Truck . . . The Raymond Corporation offers data on its lightweight hydraulic pallet truck.

Circle 144 on Reader Service Card

Slotted Angle . . . An idea brochure is available from the Dexion Division of Acme Steel Company. It gives full information on what you can do with its framing material.

Circle 3 on Reader Service Card

Marking Equipment . . . Bulletin ROL-2 from Adolph Gottscho, Inc. tells how its low cost marking attachments save thousands of dollars every year.

Circle 75 on Reader Service Card

Addressing System . . . Complete information on direct-to-container addressing systems is contained in catalog published by Weber Marking Systems Division of Weber Addressing Machine Company.

Circle 192 on Reader Service Card

Floor Machines . . . Cost saving data about the new G. H. Tennant Company floor machines is offered.

Circle 178 on Reader Service Card

Industrial Tires . . . Information on better, longer wearing tires is offered by The Goodyear Tire & Rubber Company.

Circle 74 on Reader Service Card

Gasoline Fork Trucks . . . Form 1330 from Hyster Company points out the features of Hystamatic drive, said to give the most positive inching control for stacking, carloading and close-quarter operation.

Circle 88 on Reader Service Card

Conveyor Belt Idlers . . . Bulletin 30-42 from Joy Manufacturing Company points out unique features of the Limberoller, conveyor belt idler designed to handle sticky, abrasive, dusty or corrosive materials.

Circle 97 on Reader Service Card

Rubber Molding . . . Skilled craftsmanship and strict quality control are featured by Phoenix Manufacturing Co., Rubber Division.

Circle 143 on Reader Service Card

Trolley Busways . . . Engineering data on trolley busways for crane and hoist operations is contained in descriptive literature from Feedrail Corporation.

Circle 70 on Reader Service Card

Electric Walkies . . . Eight reasons why you should buy its equipment are pointed out by The Moto-Truc Company.

Circle 128 on Reader Service Card

Overhead Handling . . . Maximum utilization of floor space and air space is possible with its stacker crane, says literature from The Louden Machinery Company.

Circle 106 on Reader Service Card

Tape . . . Free 15 yard sample of its Snake Tape is offered by Angier Corporation to demonstrate savings in sealing time and damage claims.

Circle 17 on Reader Service Card

Marking Pen . . . Cushman & Denison Mfg. Co. offers data on its heavy-duty marking pen for addressing boxes, crates, bags, cartons, etc.

Circle 49 on Reader Service Card

Powered Walkies . . . Cost saving features of Worksaver trucks are contained in literature published by Yale & Towne Manufacturing Company.

Circle 197 on Reader Service Card

Hoists . . . Bulletin DH-504 from Wright Hoist Division, American Chain & Cable Company, contains full information on electric roller chain hoists.

Circle 10 on Reader Service Card

Dock Boards . . . Bulletin DB-204 published by Magline Inc. tells how to reduce loading costs and step-up dock handling efficiency.

Circle 112 on Reader Service Card

Tape . . . Complete information on how filament tape can be used in material handling and heavy duty packaging is available from Minnesota Mining and Manufacturing Company.

Circle 123 on Reader Service Card

For the smartest move you'll ever make!
morLift
• It's amazing but true, and yet often overlooked. A simple basic principle . . . using the right equipment in the right way . . . can reduce operating costs, increase production, and improve efficiency. The MorLift can do exactly that for you. See your local MorLift distributor for complete information, or write direct.
1. Expertly engineered for versatility and ease of operation.
2. Lowest overall weight of any hydraulic straddle-type lift truck.
3. Low cost (complete with battery and charger) and fast, easy maintenance.
Manufacturer's representative or distributor—write for information on territory available.
Write to Dept. 151
JOHN MORRELL MFG. CO.
222 DUNDEE AVE. ELGIN, ILLINOIS

Circle No. 124 on Reader Service Card for more information

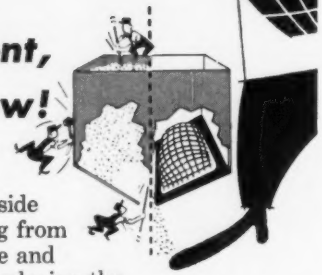
What's Your Bin S.Q.*?

* Safety Quotient

How safe are your bins? Do you require an employee to endanger his safety and possibly his life by attempting to prod hung-up material from inside the bin. If so, you are creating a definite safety hazard.

Modern plant methods call for—

PneuBin Pulsating Panels



for safe, efficient, mechanical material flow!

PneuBin panels . . . mounted on the inside walls of your present bins and operating from your regular plant air supply . . . inflate and deflate in regulated cycles positively displacing the bin contents to free flow.

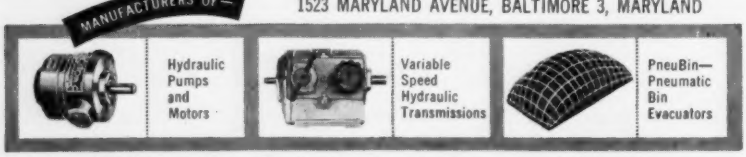
PneuBin decreases plant operating costs by reducing maintenance, insures constant material flow to production lines, eliminates accidents to personnel and increases other personnel's efficiency through its quiet operation.

Send for "*Flow Stoppage Report*" and FREE literature. PneuBin engineers will gladly make recommendations with no obligation on your part.

GEROTOR MAY CORPORATION

MANUFACTURERS OF—

1523 MARYLAND AVENUE, BALTIMORE 3, MARYLAND



Circle No. 71 on Reader Service Card for more information

AD LITERATURE

Continued

Hoists . . . Bulletins offered by Shepard Niles Crane and Hoist Corporation describe cab and floor-operated hoists.

Circle 163 on Reader Service Card

Truck Lock . . . Presto Products Company gives details on its new 5-in-1 truck floor lock that fits five size casters.

Circle 101 on Reader Service Card

Engine Meters . . . The Service Recorder Company tells in bulletin I.T. how large manufacturing plants are successfully using its meters to record standing and moving time.

Circle 162 on Reader Service Card

Roller Conveyors . . . Pre-engineered selections from the A-F line of engineered roller conveyor are contained in bulletin GP available from The Alvey-Ferguson Company.

Circle 9 on Reader Service Card

Belt Lacer . . . If you'll send a sample of your belting, apron or ribbon to Clipper Belt Lacer Company, they'll determine the best method of fastening and then lace your sample free.

Circle 50 on Reader Service Card

Portable Elevators . . . Big Joe Manufacturing Company offers data on a machine particularly engineered for "in-between-handling" of loads up to 1000 pounds capacity.

Circle 30 on Reader Service Card

Electric Fork Trucks . . . Booklet titled "Electri-Facts" published by Clark Equipment Company contains cutaway of important components of electric fork trucks and points out important features.

Circle 43 on Reader Service Card

Precision-Built Colson® Factory Trucks

Save Time, Money and Effort

COLSON TRUCKS Save Time

...by streamlining the flow of goods from raw materials, through production to storage or shipment of finished products.

COLSON TRUCKS Save Money

...by cutting manhours spent in wrestling heavy loads around on hard-to-push, out-of-date trucks.

COLSON TRUCKS Save Effort

...by letting easy-rolling COLSON wheels and casters *float* the load—even over rough, bumpy floors.

Whatever *your* materials-handling problem there's a COLSON truck, standard or special, to meet your needs—exactly. Write us or, better still, consult the yellow pages (under "Trucks-Industrial") for the COLSON office near you.

Famous Push-E-Z Platform Truck fully loaded starts and rolls with half the effort required by the average truck. It's the strongest hand truck ever built! Capacity 6000 pounds with metal or molded plastic wheels, 3000 pounds with cushion tread, rubber tires.

The COLSON Universal Drum Truck is the answer to fast safe handling of drums and barrels. It locks any size container between adjustable chimb hook and pick-up tips, lifts it easily and carries it with the weight evenly balanced over the wheels.

The COLSON Lift-Jack System easily doubles the efficiency of conventional hand trucks. Handling goods through production, in and out of storage, on and off freight cars or trucks, it lets one man *easily* do the work of two!

THE COLSON CORPORATION

ELYRIA, OHIO

CASTERS • HAND TRUCKS • LIFT JACK SYSTEMS

HYDRAULIC, ELECTRIC AND MECHANICAL POWER LIFTS AND TRANSPORTS

Circle No. 46 on Reader Service Card for more information

World's most popular pallet truck!

MODEL L2P
Capacity 2,000 lbs.

RAYMOND *Lightweight*

HYDRAULIC PALLET TRUCK

- INVEST IN THE BEST when buying a lift truck . . . get a Raymond Lightweight Hydraulic Pallet Truck. This superbly built truck is rightly the world's most popular, has 2,000 lb. load capacity.
- Aluminum alloys make it lightweight, easy to pull, yet plenty rugged. Frame is one-piece welded steel. Foot pedals lift and lower your loads. Has safe, dual-purpose brake plus patented booster roll to provide effortless pallet entry. Completely precision hydraulic for dependable operation. Years of use and abuse have proved it to be the best pallet truck money can buy.

MAIL THIS COUPON

The RAYMOND CORPORATION

3388 Madison St., Greene, N. Y.

Send latest Bulletin on Raymond Lightweight Hydraulic Pallet Truck.

☐ Check if you wish representative to call.

NAME _____ TITLE _____

COMPANY _____

STREET _____

CITY _____ STATE _____

Circle No. 144 on Reader Service Card for more information

association and society NEWS

• **New member** companies of The Material Handling Institute, Inc. are The New York Air Brake Company, Hydreco Division, and Hartman Metal Fabricators, Inc. R. J. Murphy and Elmer C. Hartman will represent their respective firms.

• **The 9th** semi-annual meeting of the National Wooden Pallet Manufacturers Association will be held at Ellinor Village in Daytona Beach, Florida, January 22-24. Under consideration for publication will be a set of grading and inspection rules, and information on expendable pallets and maintenance of pallets. A research and development program will also be discussed.

• **Earl R. Lutz,** material handling engineer with Atlas Powder Company and member of the American Material Handling Society's Philadelphia Chapter, has been named to the Materials Handling Advisory Committee of the National Security Industrial Association. The committee on which Lutz will serve is one of 13 which are actively working on Armed Forces problems which can be solved through the pooled know-how of American industry.

• **Material handling methods** to be introduced at Chicago's new Lake Calumet port facilities, which will provide terminals for freight through the St. Lawrence and Mississippi waterways, were described at

the December meeting of the Chicago Chapter of the American Material Handling Society. Recently elected president of the chapter is James J. McCabe, who succeeds Lynn J. Riege, new national director.

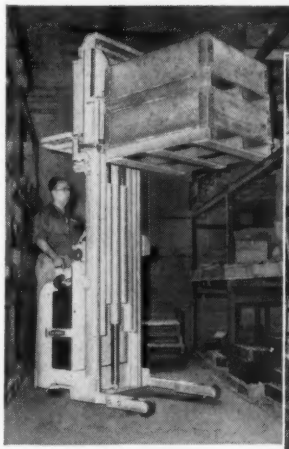
• **Major factors** in Ford Motor Company's material handling program will be explained by Vice President D. J. Davis in Milwaukee, January 17. Sponsoring the all-day conference are the Wisconsin chapters of the American Material Handling Society and Society of Packaging and Material Handling Engineers. Also participating in the conference stressing material handling, packaging, traffic and shipping, equipment, cost reduction and outdoor storage are A. M. Barrett, Jr., Barrett-Cravens Co.; Irving M. Footlik, Irving M. Footlik & Associates; C. R. Gustafson, American-Standard Co.; R. A. O'Reilly, Jr., General Motors Corp.; F. E. Cummings, Drake, Startzman, Shean & Barclay; A. L. Donaldson, Minnesota Mining & Mfg. Co.; John R. Wood, Jr., Clark Equipment Co.; and P. A. Schueble, A. O. Smith Corp.

• **Date** of the 49th annual exhibit of the Canning Machinery and Supplies Association has been moved up 24 hours. The exhibit will now open on Wednesday, January 18 and run through Saturday, January 21. E. N. Funkhouser, G.M.&S.A. president, said the decision to run an extra day was due to the heavy advance registrations and enthusiastic participation by exhibitors.

• **Purdue University's** Department of Industrial Engineering is sponsoring a two-day conference on material handling, February 16-17. Cooperating with the school is the Indianapolis Chapter of the American Material Handling Society.

Store 50% More

. . . in your existing warehouse



Reach-Fork permits 6-ft. aisles without special racks or pallets.

Reach-Fork extends forks to deposit load, retracts them in seconds. Base forks do not straddle bottom pallet.

RAYMOND Reach-Fork TRADE MARK

ELECTRIC TIERING TRUCK

TODAY YOU CAN STORE up to 50% more in your warehouse. The Raymond Reach-Fork eliminates wide aisles required by counter-weighted trucks . . . tiers in space-saving 6-ft.* aisles instead. It does this in any warehouse (yours included) using existing racks and pallets.

REACH-FORK is ideal for loading, unloading. Stacks pallets closely on racks, in boxcars, truck trailers, bulk storage areas. Safe on elevators, low-capacity floors. Available in 2,000 and 3,000 lb. cap. May be purchased or leased over 1 to 3-year periods.

*For exact aisle width, request Raymond representative to survey your operation.

SEND FOR BULLETIN

MODEL E3RT Reach-Fork Electric Tiering Truck. Telescopic model, 3,000 lb. cap.

The RAYMOND CORPORATION

3385 Madison St., Greene, N.Y.

Please send me a Bulletin on:

☐ 2,000 lb. cap. Reach-Fork.
☐ 3,000 lb. cap. Reach-Fork.
☐ Have representative call.

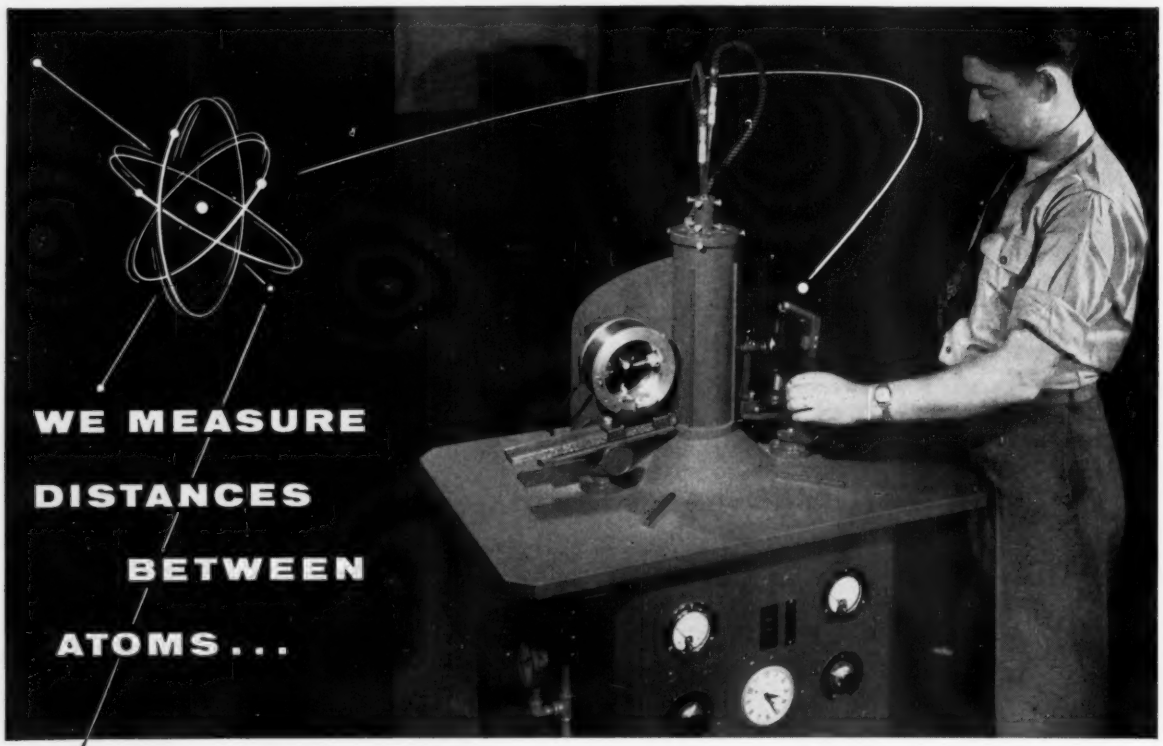
NAME _____ TITLE _____

COMPANY _____

STREET _____

CITY _____ STATE _____

Circle No. 145 on Reader Service Card for more information

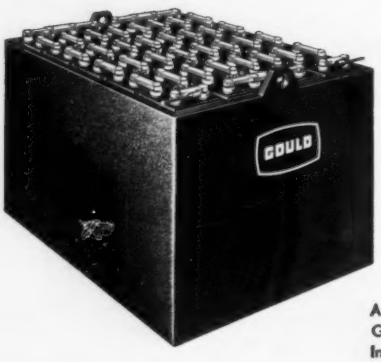


TO GIVE YOU *Advance Design* BATTERIES!

The X-Ray Diffraction Unit shown above is one of the few instruments of its kind being used in basic battery research. It identifies complex metallic compounds which cannot be identified practically by chemical means. It does this by actually indicating on film the distances between atoms, enabling Gould engineers to study atomic structure.

This instrument . . . this research . . . is revealing hitherto unknown facts about the relationship between molecular activity and battery performance . . . pointing the way toward more powerful, longer lasting active materials. That's why you get *better* batteries when you buy Gould!

For the full story on Gould Research, send for Booklet 749.



America's Finest!
GOULD
Industrial
Truck Batteries

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GOULD
Batteries

GOULD-NATIONAL BATTERIES, INC.
TRENTON 7, N. J.

"BETTER BATTERIES THROUGH RESEARCH"

Always Use Gould-National Automobile and Truck Batteries

Circle No. 76 on Reader Service Card for more information

NEW 6-ton self-propelled BANTAM works the entire yard with one man!

Lifts

Loads

Stacks

Transports

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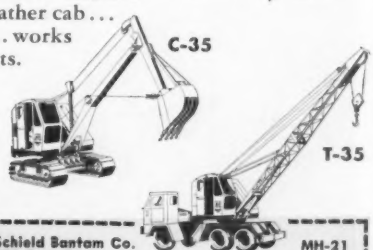
MATERIALS

Faster, Cheaper!

and it's only $11,500*

The perfect machine for high-speed loading and unloading of pipe, steel, manufactured parts, building materials ... big-capacity handling of bulk materials . . . efficient moving of parts and materials in and out of plants. Lifts up to 12,000 lbs. . . . loads up to 100 cu. yds. per hour as shovel. *All done by one operator, one machine!*

Built with all the job-speeding features — independent travel, forward and reverse . . . easy maneuverability; turns inside 40 ft. circle . . . 360° full-circle swing . . . power *up* and power controlled lowering for accurate, safe handling . . . all-vision, all-weather cab . . . hydraulic precision steering . . . works with 9 easy-change attachments.



The world's fastest selling rubber- and crawler-mounted cranes-excavators with over 6600 BANTAMS in money-making service in all industries . . . your positive proof of bigger value, better performance, lower job costs!

**As shown complete with crane boom, outriggers, hook block (less boom safety stops) F.O.B. Waverly, Iowa.*

SCHIELD Bantam Co.

251 Park St., Waverly, Iowa, U.S.A.

World's Largest Producers of Truck Cranes and Excavators

Try a BANTAM in your yard ask for Free demonstration TODAY!

Schield Bantam Co.
251 Park St.
Waverly, Ia.

MH-21

Send me full details on BANTAM Cruiser and your demonstration plan. Also

☐ Carrier Mounted ☐ Crawler Mounted ☐ Pedestal Mounted

Name_____

Title_____

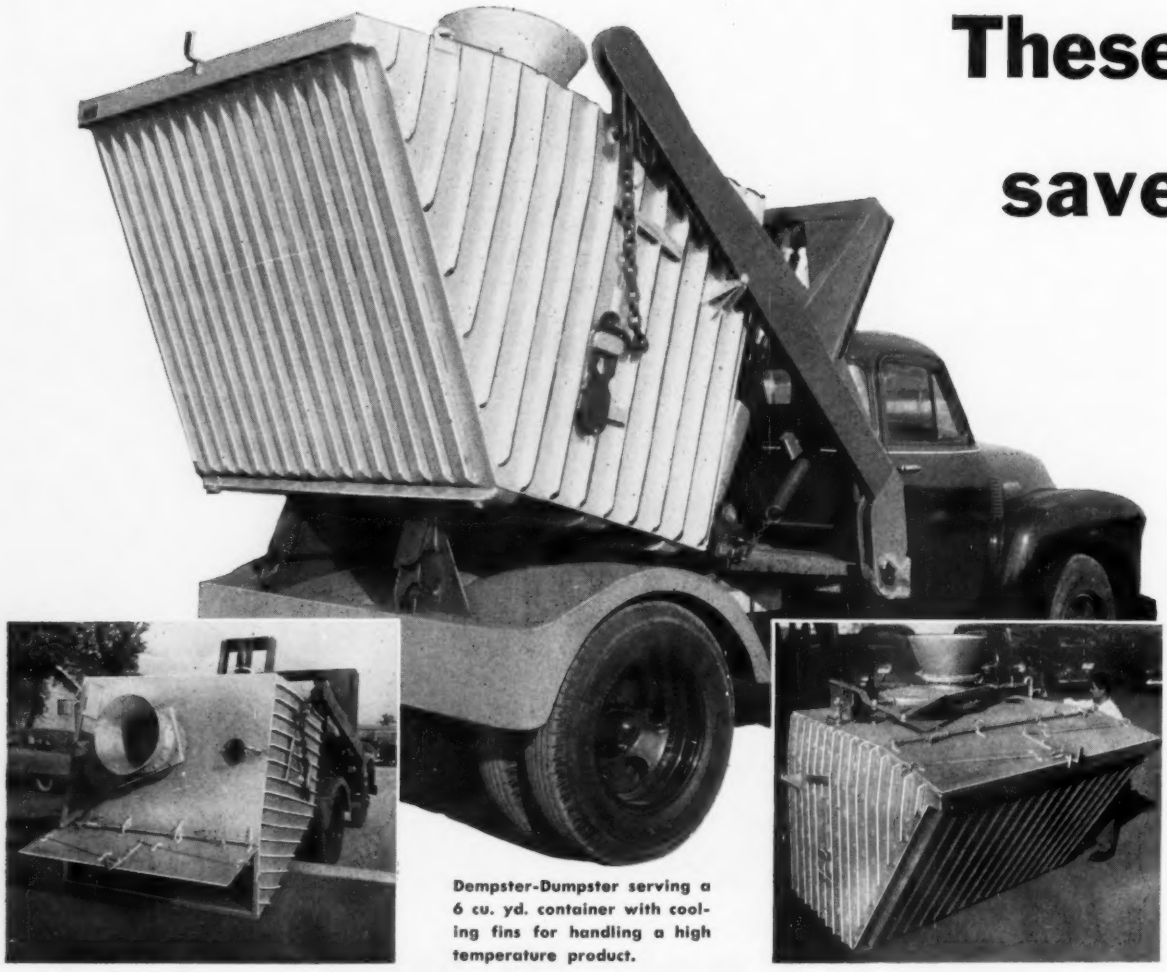
Company_____

Address_____

City_____ State_____

Circle No. 164 on Reader Service Card for more information

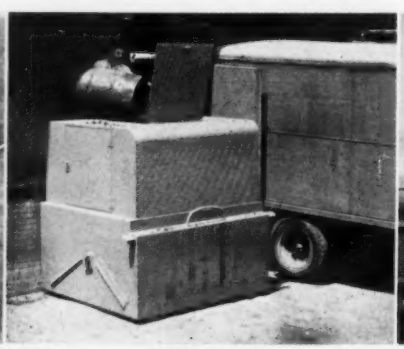
These save



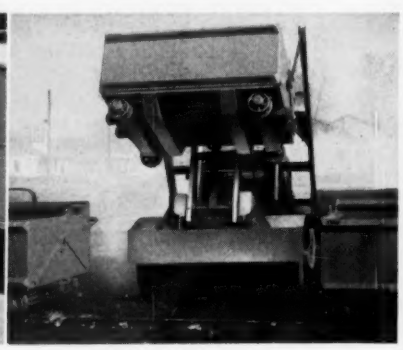
Dempster-Dumpster serving a 6 cu. yd. container with cooling fins for handling a high temperature product.

Here are a few of the hundreds of Detachable Containers we have built to solve handling problems of every description. A few others not shown include those with compartments . . . with insert containers . . . fully-insulated . . . lined with lead . . . lined with fire brick . . . with windows and doors . . . with casters . . . flat bottoms and open at one end . . . with teeth . . . with shelves for tools and supplies—and we could describe hundreds more, all served by one Dempster-Dumpster and only one man, the driver.

This 3 cu. yd. Container has skids for fork lift truck transfer.



10 cu. yd. Container widely used for refuse and combustible wastes.



Flanged wheel equipped containers for remote loading.

5176

DEMPSTER BROTHERS

4 manufacturers to $82,000.00 annually handling waste materials!

These four industrial plants expect to save, in labor costs alone, during the first five years service of the Dempster-Dumpster System—

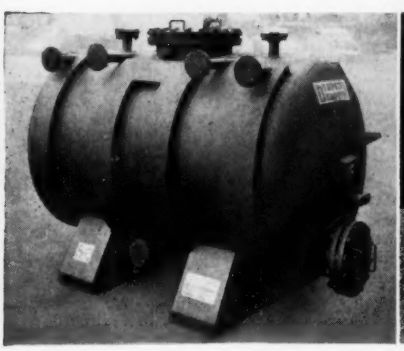
A PLASTICS PLANT: $26,958.00 savings on an investment of $9,523.50 in Dempster-Dumpster equipment. Savings alone pay for equipment in two years.

A CHEMICAL PLANT: $204,076.75 savings on an investment of $40,968.00 in this equipment . . . savings pay for equipment in one year.

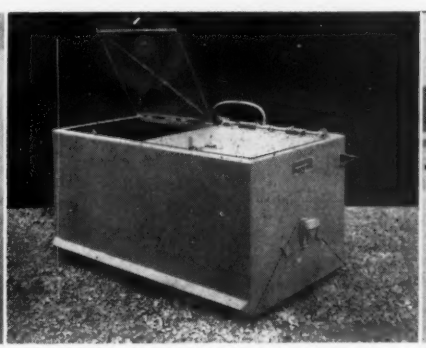
AN AUTOMOTIVE PLANT: $135,000.00 savings on an investment of $19,272.00 . . . savings pay for equipment in 9 months.

A PAPER AND PULP MILL: $43,104.00 savings on an investment of $10,750.00 . . . savings pay for equipment in 1¼ years.

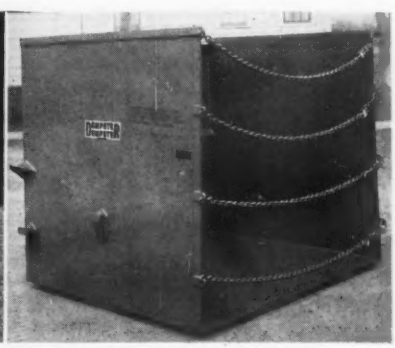
Those are typical examples. Visualize a Dempster-Dumpster, operated by only one man, the driver, serving scores of big steel containers, one after another, in your plant. Containers of many designs and types, handling waste or salvable materials, raw or finished products, fluids including acids, combustibles, dusty materials—anything that can be handled in up to 21 cu. yd. detachable Dempster-Dumpster Containers . . . payloads up to 19 tons. Savings are tremendous! Take advantage of our free engineering service, which determines by fact-finding survey the cost cutting possibilities of this system in your plant. Dempster Brothers, Inc.



600 Gal. stainclad tank with brine cooling channels.



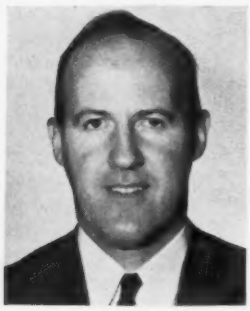
A Container available up to 10 cu. yds. with or without lids for many uses.



A 9 cu. yd. container for handling packaged products.

616 Shea Building, Knoxville 17, Tenn.

MEN in the NEWS



A. M. Kelly

At **Coffing Hoist Division** . . . . **Andrew M. Kelly** has been appointed manager of the newly-created customer service department. In this capacity he will supervise all correspondence dealing with orders, deliveries and customer relations, and will work in liaison with the production and engineering departments. Kelly is a graduate of the Georgia Institute of Technology and served as a Marine fighter pilot in World War II and the Korean conflict.

At **Ingersoll Kalamazoo Division** . . . . **Robert F. Schutz** has been named vice president and manager of this division of Borg-Warner Corp. He joined the company in 1944 and previously was manager of the division.

Carter Bond Dies

C. Carter Bond, president of Bond Foundry and Machine Company, died suddenly November 10 at his home in Rydal, Pennsylvania. He was 65. Mr. Bond was a past officer and director of the Caster and Floor Truck Manufacturers' Association, and had been active in the industry for many years.

At **Emery Air Freight Corp.** . . . . **Ellis D. Slater** has been elected to the board of directors. He is president of Frankfort Distilleries Incorporated and serves as a director of numerous other prominent companies.

At **Robert Gair Company, Inc.** . . . . Special production representative of the Container Division is **Joseph M. Murphy** who joined the firm in 1921. He will headquarter in New York City, reporting directly to **J. P. Greiveldinger,** general production manager, but will spend a majority of his time at the 16 container plants located throughout the United States.

R. W. Bruins

At **The Colson Corporation** . . . . The newly-created position of manager of Handler Sales has been filled by **Robert W. Bruins** who was previously general manager of Gilbert Mann Company, Cincinnati representatives for Towmotor Corporation. A graduate of the University of Wisconsin, he was a director and secretary of the Ohio Valley Chapter of the American Material Handling Society.

At **General Electric Co.** . . . . Manager of Marketing for the Electronics Division, **Ernest H. Vogel,** has retired. Widely known in the field of marketing, Vogel has specialized in merchandising since 1919 and served as an advertising and sales executive for a number of prominent companies.

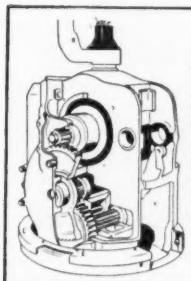
At **The Dow Chemical Co.** . . . . **Floyd J. Gunn** has been advanced to manager of the Los Angeles office. He previously was manager of Coatings Sales for the Plastics Department, a position he had held for six years.

At **Automatic Transportation Co.** . . . . **Charles S. Beshore** has been named director of purchases, succeeding Carle J. Blakeslee, retired. Beshore joined the firm in 1951 as director of systems and procedures.

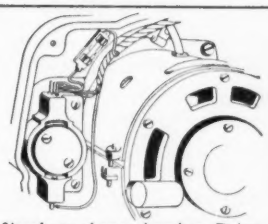
At **Permacel Tape Corp.** . . . . **Donald B. Roberts** has been appointed Missouri Valley division manager and **Charles F. Euler** named Boston district manager.

At **Westinghouse Air Brake Co.** . . . . **Louis E. Dondero** has been named manager of the Cleveland Rock Drill plant of the Le Roi Division, succeeding Russell R. Morgan, retired.

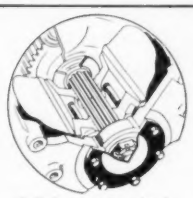
Only Yale *Worksavers* have these 5 big features for longer trouble-free service



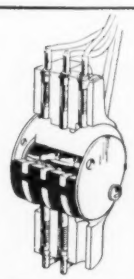
Gears operate in an oil bath—will last the lifetime of the truck. This powerful drive unit is entirely enclosed and floats on 105 ball bearings. Gears are drop-forged nickel-chrome-molybdenum, heat-treated and mounted on heavy duty ball bearings.



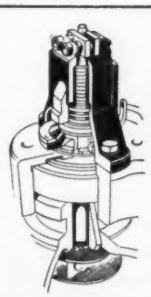
Simple to change brushes. Drive motor is of a high torque series-wound type, specially designed for easy cleaning and adjustment.



Split hub—locks wheel to splined axle—prevents axle wear, provides for quick tire change.



No frayed, broken wires. Flexing, chafing and bending of wires eliminated by slip rings built into the base of the handle. No matter how the handle is turned or lifted, wire cannot be twisted or bent.



A king pin assembly built to take impact loads. The load-carrying tapered roller bearing and large diameter steering ring ensures perfect alignment of the unit. Wires cannot bend whatever the angle of the turn.

Yale Pallet *Worksaver* handles merchandise for a leading warehouse.

Yale Worksavers are the only industrial electric trucks of their type that have the engineering features that control *all* the factors that cause breakdowns. Five of these features are shown at the left. They offer you longer truck life with less down time over the years for maintenance and repair. This is especially important if your operation requires only one or two trucks. Your costs—and this is true of operations of *every* size—shoot up when vital handling equipment is idle.

Of course, you get much more than unmatched reliability with Yale ***Worksavers.*** They are small, light, maneuverable—perform big-truck jobs but go where big trucks often can't, on freight elevators, over low-load floors and in tight areas. You can even reduce aisle widths, save space for more productive use.

Yes, a Yale ***Worksaver*** will do a great deal for your business. Why don't you find out now which model is best for your purposes? Choose from pallet, tractor, platform and high-lift fork types in capacities up to 7,500 lbs. Select with the assurance that only Yale ***Worksavers*** give you so many proven cost-saving features. For information, write Yale & Towne Manufacturing Company, Philadelphia 15, Pa., Dept. 41.

YALE* **INDUSTRIAL LIFT TRUCKS AND HOISTS**

*REG. U. S. PAT. OFF.

Gas, Electric, Diesel & LP-Gas Industrial Trucks • *Worksavers* • Warehousers • Hand Trucks • Hand & Electric Hoists

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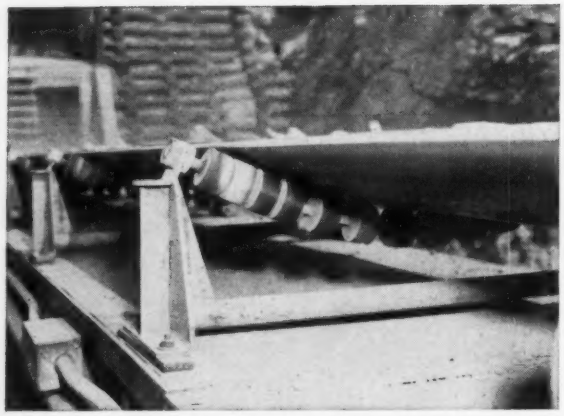

NEW CONVEYOR BELT IDLER

Handles sticky, abrasive, dusty, or corrosive materials.

Has only two bearings—up out of the dirt.

A 2-bearing, cable suspension idler that resists dust, abrasion, corrosion and material buildup is proving itself superior for bulk handling in many industries.

Called the Limberoller, it has already given *10 times* the service life of replaced steel idlers in handling abrasive foundry sands, coal, petroleum coke, potash, copper ores, copper mill tailings, iron ore, wet concrete, triple super phosphate, ammonium sulphate, and sticky fertilizers.

Pressure-molded neoprene or rubber discs on a flexible steel cable conform to load and cushion the belt, help keep belt aligned, and are self-cleaning. The two bearings are up out of the dirt zone; have had no design failures.

Unaffected by most corrosives that damage steel, the new idler is ideal for chemical, sulphur and salt plants; corrosive and high ozone atmospheres. It is more abrasive-resistant than steel and flexes out of the way of abrasive materials.

The Limberoller weighs ⅔ less than a conventional steel idler; is locked by a simple cotter key into special lightweight stands for easy installation and removal. No cover sheets are needed. Two types of stands are available: one that bolts to conventional rigid sections; and a self-supporting type that forms its own easily-erected portable sections without bolts, by using special stiffening rails.

Because of these unique features, many companies have adopted Limberollers as standard for all belt conveyor operations. Details from *Joy Mfg. Co., Oliver Bldg., Pittsburgh 22, Pa. Request Bulletin 30-42.*

Circle No. 97 on Reader Service Card for more information

MEN IN THE NEWS

Continued

M. H. Smith

D. R. Shaffer

At **Hyster Company** . . . . **M. H. Smith** has been promoted to assistant manager of the factory in Nijmegen, The Netherlands, and **Donald R. Shaffer** has been named district manager of the north central district of the Eastern Industrial Truck Division. Smith joined the company in 1942 and held various executive engineering positions in this country prior to being assigned to the Nijmegen plant in 1952 as chief engineer. Shaffer previously was manager of the Long Island City, New York office, and in his present capacity will work with five eastern dealers.

At **Fruehauf Trailer Co.** . . . . Directors approved a change in the by-laws to increase the board membership to 16, and elected **Thomas S. Nichols** as a member. Nichols is president of Olin Mathieson Chemical Corp.

At **Century Electric Company** . . . . **B. J. Gill** has been named Northwest district manager and will work out of new district offices in Spokane, Washington. He will be assisted by **Ralph Price,** manager of the Seattle office.

At **Thompson Products, Inc.** . . . . . **Allen S. Johnson** has joined the Electronics Division as assistant to Division Manager **William M. Jones.** For the past 12 years Johnson has been associated with Webster-Chicago Corp.

At **Hewitt-Robins, Inc.** . . . . . **Donald V. Sarbach** has been named to fill the newly-created position of research director. He will be a member of the company's executive staff in Stamford and will serve in an advisory and consulting capacity to technical and research departments at various manufacturing plants. For 18 years Sarbach was associated with B. F. Goodrich Company during which time he was awarded 30 patents on various rubber and chemical products and processes.

ACCO products

WRIGHT Electric Hoists for Top Production, Easiest Maintenance

WRIGHT *Speedway* Electric Hoists—Frame 1, Frame 2 and Frame 3—are ideal **HOISTS** for handling production materials where the load requirements **ARE** from ¼ ton to 10 ton capacity. Their design includes many advanced **SAFE** operating features. Sound choice of components provides them with **EFFICIENT** balance for smooth running. Parts are designed and built to give **RUGGED** performance with a minimum of care. Plant operating men find them **ADAPTABLE** to almost every type of shop work because of the wide range of speeds, lifts and mountings.

The more particular you are in your selection of hoisting equipment—the more likely you are to choose WRIGHT

Write our York, Pa., office for any or all of these fully informative bulletins—

Bulletin DH-133B on Frame 1 and 1½ WRIGHT Speedways
Catalog E-54A on Frame 2 and 3 WRIGHT Speedways
Bulletin DH-504 on WRIGHT Electric Roller Chain Hoist

ACCO

Wright Hoist Division
AMERICAN CHAIN & CABLE

York, Pa., Atlanta, Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

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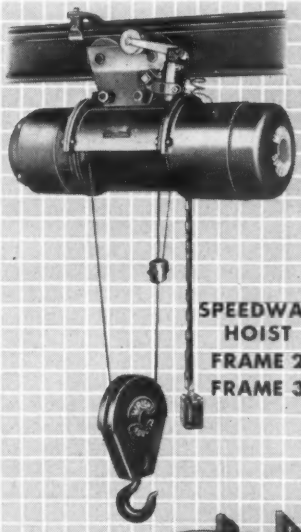
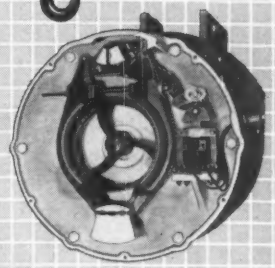
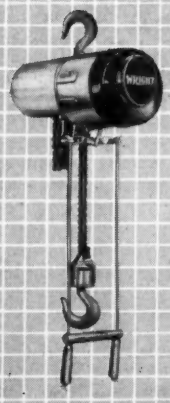
for Better Value



SPEEDWAY HOIST FRAME 2 FRAME 3



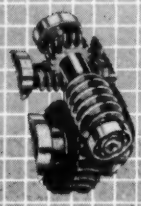
MOTOR BRAKE & SOLENOID FRAME 2 and FRAME 3 HOIST
"Nothing to adjust but the cam!"



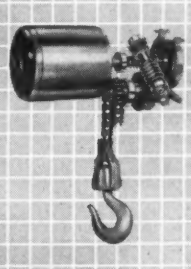
WRIGHT
Electric Roller Chain Hoist

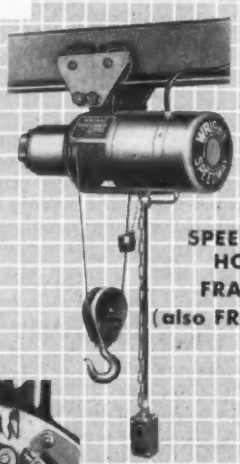
- ¼, ½, 1 and 2-ton capacities
- Fewest number of wearing parts
- Self-locking, double-worm gear acts as own load brake
- Spring-set, shoe-type motor brake, clam shell type
- Oversize precision ball bearings
- Forged steel-alloy hook, swings and swivels

COMPETITIVELY PRICED

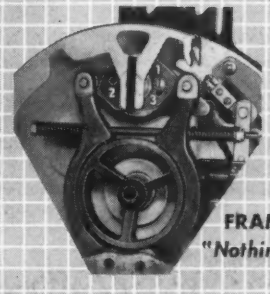


THIS DOUBLE-WORM GEAR ELIMINATES TROUBLESOME LOAD BRAKES





SPEEDWAY HOIST FRAME 1 (also FRAME 1½)



MOTOR BRAKE FRAME 1 and FRAME 1½
"Nothing to adjust but the cam!"

THE NEWEST AND BEST IN SHELVING!

KLIP-BILT®

STEEL SHELVING

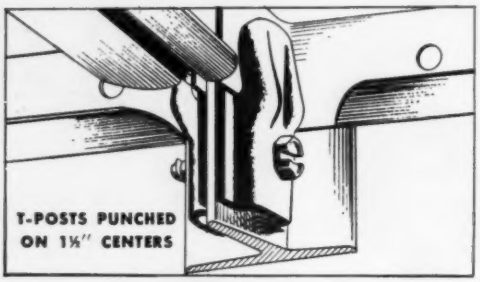
Pat. Pend.

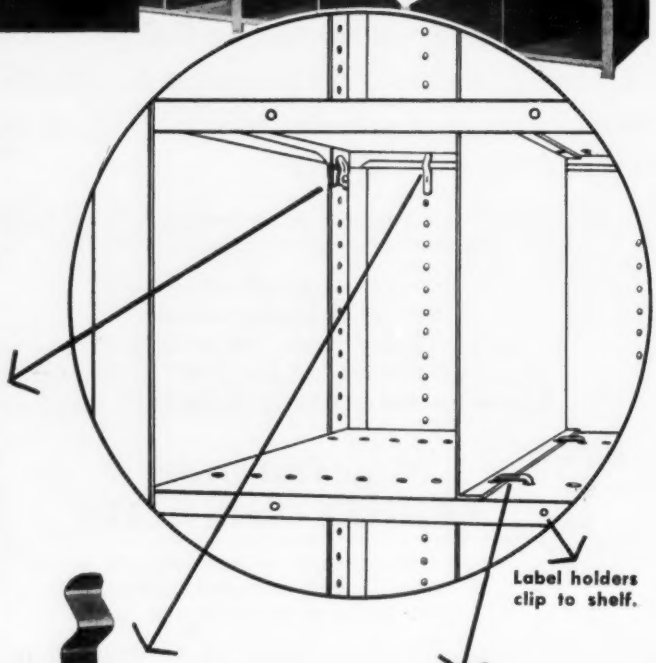
installed fast without tools . . . combines high strength with low installation cost

KLIP-BILT, the revolutionary new boltless steel shelving, provides the fastest, simplest assembly of high strength storage equipment yet developed!

All fastening is with simple clips . . . easily installed by hand yet ingeniously designed to hold shelves, panels, dividers, and T-posts of various thicknesses pressure tight. Clips can be quickly disengaged, too, to permit easy rearrangement or disassembly of shelves.

Manufactured in standard sizes and parts.





SHELF CLIP

Just three parts for quick installation. Hardened cadmium-plated threaded stud and two heavy formed steel clips, one having stamped thread. Holds shelf flange tight against tough, rail steel T-post to prevent shelf from sagging when heavily loaded.

PANEL CLIP

Secures back panels to shelf flanges. Engaged at each shelf level. Quickly and conveniently installed from in front of shelving.

DIVIDER CLIP

Locks into two shelf holes to provide firm anchorage. Clips are flat, do not interfere with storage above or below shelf.

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A SHELF FOR EVERY LOAD

A. For average loads
B. For heavy loads (Front and rear flanges reinforced.)
C. For extra heavy loads (Type B with sides and center reinforced.)

WRITE FOR BULLETIN 701.

The FRICK-GALLAGHER MFG. CO.

105 S. MICHIGAN AVENUE, WELLSTON, OHIO

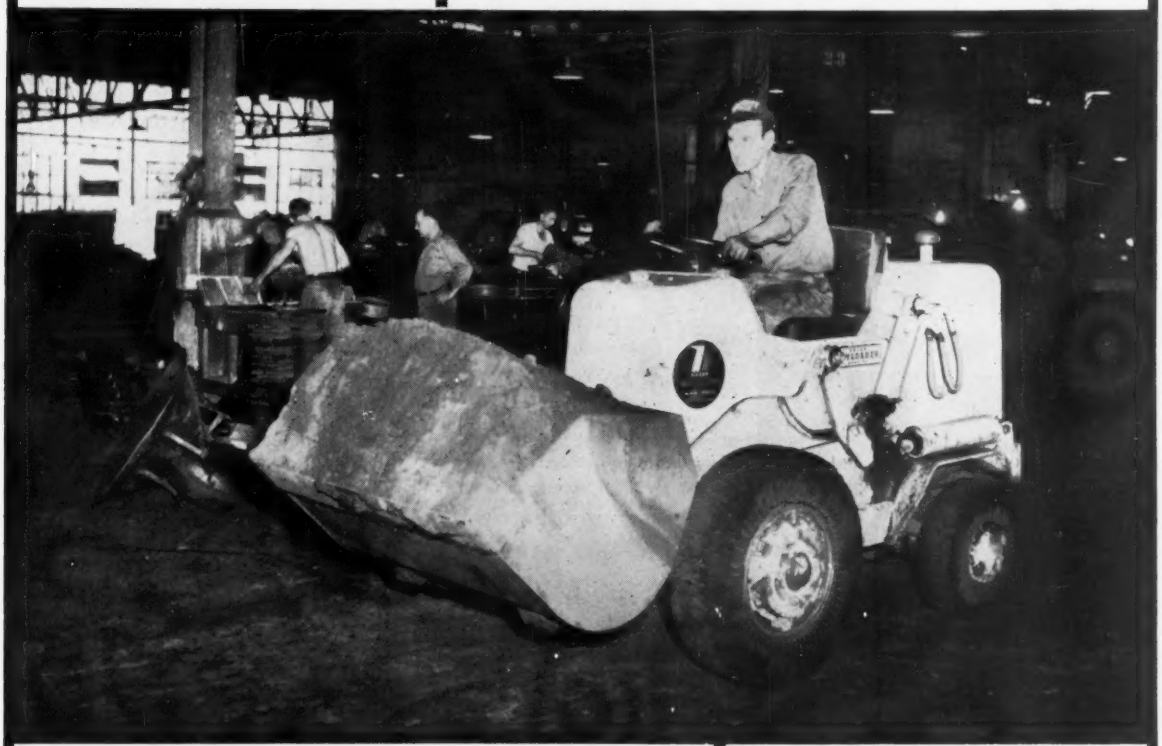
Branch Office: 250 S. Broad St., Philadelphia 2, Pa.

Specialists in Storage Planning and Manufacturing of Storage Equipment

Circle No. 69 on Reader Service Card for more information

30 TONS PER HOUR

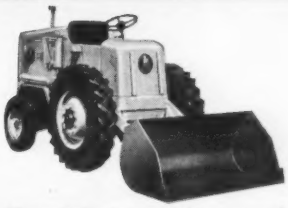
performance only a PAYLOADER® can deliver



This 1955 model HA is the youngest of three "PAYLOADER" units working at Pennsylvania Malleable Iron Corp., Lancaster, Penn. It is also the most productive tractor-shovel for its size that they have ever seen. Mr. E. F. Stolpe, the owner says, "Believe the new HA the best machine for our operations." It is used mostly for handling sand and coal — moves 30 tons per hour, 55 hours per week.

Hundreds of other owners of the new model HA are equally enthusiastic and pleasantly surprised by the superior performance and greater capacity of the new model HA. "Roll-back bucket carries more material" . . . "does the work of two machines on some operations" . . . "less spillage and practically no floor clean-up" are some of the actual comments from other owners.

It will pay you to find out what a "PAYLOADER" can do for your material handling problems. Your "PAYLOADER" Distributor is ready to show you. Use the handy coupon opposite.



For higher lifts and more capacity — the new model HAH 1 cu. yd. capacity

THE FRANK G. HOUGH CO.
731 Sunnyside Ave. • Libertyville, Ill.

- ☐ Send data on Model HA (1⅛ cu. ft.)
- ☐ on new model HAH (1 cu. yd.)
- ☐ on larger models

Name_____

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Street_____

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SAY HUFF

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
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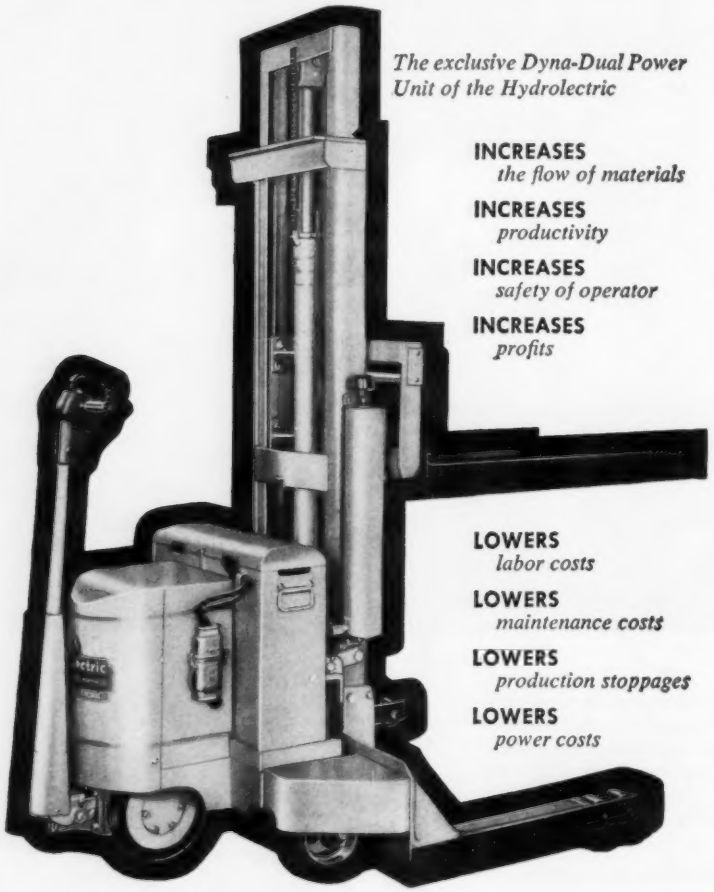
MODERNIZE WITH

America's most Modern Truck

HydroLectric

A GREAT NAME IN LIFT TRUCKS



The exclusive Dyna-Dual Power Unit of the Hydrolectric

INCREASES *the flow of materials*

INCREASES *productivity*

INCREASES *safety of operator*

INCREASES *profits*

LOWERS *labor costs*

LOWERS *maintenance costs*

LOWERS *production stoppages*

LOWERS *power costs*

The only truck with 2 driving wheels and 2 braking systems. In fact Hydrolectric does everything a good lift truck should do.

STUEBING Designed • Engineered • Built

LIFT TRUCKS INC. W.W.W. STUEBING CINCINNATI

LIFT TRUCKS, INC., / CINCINNATI 14, OHIO

THERE IS A TRUCK FOR EVERY PURPOSE TO HANDLE ANY KIND OF MATERIAL.

Circle No. 103 on Reader Service Card for more information

Let's Look at the Real Picture of "Automation"

It was our privilege recently to "tour" Ford's new Stamping Plant in Walton Hills, one of Cleveland's eastern suburbs, along with 100 or more representatives of the daily and industrial press, radio and television. One of the visitors —a lady Industrial Editor of an important daily newspaper— wrote, among other things:

"Ford employs 3,800 people at Walton Hills, and 3,000 tons of sheet steel go through the plant in a single day, yet none of the metal is lifted or carried around by hand . . ."

Now, quarreling with a lady is foreign to our gentle nature. Even when she makes what seems to us an obsequious bow to the currently-popular—or notorious—word "automation." We can't help but regret that she missed the opportunity to tell her paper's several hundred thousand readers the real significance of Ford's progress in automating many steps in the production processes.

In building, twice expanding, and then opening its new stamping plant, Ford provided in the neighborhood of 3,000 more jobs for the Cleveland-area labor supply. (When completed, its new engine plant—No. 2 in the Cleveland Metropolitan Area—will have provided another 2,500 jobs.)

Why are so many workmen needed in these so-called "automated" plants? Well, four human hands are required to actuate every stamping machine, or press; this for safety's sake. Despite the lady editor's report that no metal "is lifted or carried around by hand", hundreds of human hands —each equipped with a vacuum sheet-lifter—pick up, turn and/or

transfer many, many times practically every stamping.

As advanced as "automation" is in the new Ford plants, very much remains to be done. This is true in other so-called "automated plants", or "automatic factories", as well. Car-loading, for example, is a slow, manual operation that seems almost antiquated after watching the speed and efficiency of production.

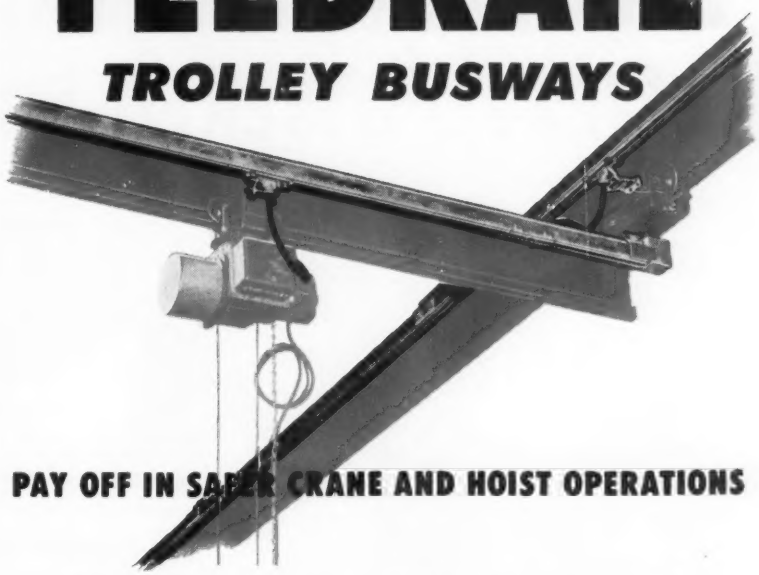
But, all-in-all, here was a picture of Utopian working conditions—good light and air; cleanliness; every conceivable safety device; every possible worker convenience including showers, individual lockers, cafeteria and ample parking areas; expenditure of human effort—of muscle-power—reduced to within a very few degrees, perhaps, of the absolute minimum. Here was a picture of unparalleled progress in human and employee relations—yes, in public relations.

No threat here to workmen! Rather, a boon. The tools of "automation"—of production FLOW—are each subject to maintenance and repair, and to replacement either through wear and tear or through obsolescence. Chain, roller, belt, gravity conveyors; light hoists and behemothic overhead cranes; mobile storage racks; countless wheels and casters; various types of tote boxes; dockboards; bridge ramps; trailers; industrial towing tractors; powerized electric hand trucks; forklift trucks fueled by gasoline or by LP-Gas; floor sweepers; "fingers", "hands" and "arms" looking and behaving like Rube Goldberg creations; electronic controls; industrial television and other automatic or electronic communications and recording devices; sheet-lifters; engineered freight cars and custom-made dunnage—all these operating, necessarily, as one, in harmony, in rhythm denoting perfect integration of all into a handling system as modern as tomorrow.

Here was a team of tools supporting the highest living standards, the soundest economy in history. But more importantly, perhaps, securing for man the ennobling dignity to which he has a God-given right.

FEEDRAIL®

TROLLEY BUSWAYS



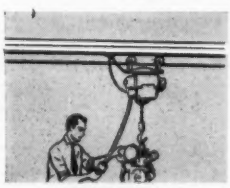
PAY OFF IN SAFER CRANE AND HOIST OPERATIONS

When FEEDRAIL goes into your plant—the danger to personnel and equipment from exposed wiring goes out.

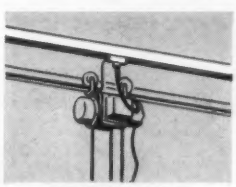
With its sliding contacts and its current-carrying copper bus bars enclosed in a sturdy steel housing every inch of the way, FEEDRAIL comes as close to giving you *100% safe crane and hoist electrification* as you can get. There's no chance of frayed, sagging or broken wiring—there's no danger of accidental contact with exposed conductors—and there are no long cables trailing in aisles and work areas.

The result—fewer electrical accidents—faster, more efficient materials handling—safer and less frequent maintenance—and lower insurance rates as a result of improved safety records and the elimination of hazardous working conditions.

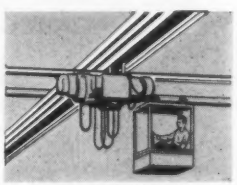
What's this mean to you? Simply that the savings you'll make will quickly repay the cost of your FEEDRAIL installation.



FEEDRAIL "60"
for budget hoists



FEEDRAIL "100"
for heavy duty hoists and light tonnage cranes



FEEDRAIL "HEAVY DUTY"
for big tonnage cranes and hoists

GET THE DETAILS

We'll be glad to send you descriptive literature giving full details and engineering data. Address Dept. F-1.

SOLD BY MORE THAN 1,000 ELECTRICAL DISTRIBUTORS FROM COAST TO COAST

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Never Becomes Obsolete

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125 BARCLAY STREET • NEW YORK 7, N. Y.

SPECIALLY QUALIFIED REPRESENTATIVES IN PRINCIPAL CITIES

Circle No. 70 on Reader Service Card for more information

BAKER announces a NEW LINE of BATTERY-POWERED FORK TRUCKS

with many added features...

Capacities to 6000 pounds

- **EASIER TO STEER**—Less weight on steering axle, combined with automotive type steer, provides finger-tip control even on largest models.
- **MORE CONVENIENT CONTROLS**—Located right where operator wants them. Easy and simple to actuate.
- **FULL VISIBILITY**—No cowl, no console—no "neck craning." Greater safety, less operator fatigue, more work.
- **EASIER TO GET ON OR OFF**—Absence of cowl and other obstructions means easier and faster mounting and dismounting.
- **DYNAMIC BRAKING**—Greater safety on ramps, smoother stops, less wear on brake lining, greater protection for truck and load.
- **SEPARATE PARKING BRAKE LINKED TO DRIVER'S SEAT.** Automatically holds truck when driver dismounts—even on incline. On armature shaft—independent of wheel brakes.
- **HYDRAULIC WHEEL BRAKES**—Finest available. Self-energizing, self-equalizing. Single point adjustment.
- **STRONGER STEERING AXLE**—Double-yoke construction and rubber mounting reduces road shocks and means smoother riding for operator and load.

The new Baker FT line of electric fork trucks is engineered for maximum efficiency, operating convenience and economy, with minimum maintenance and down time. Reliable Timken axle is specially designed for industrial truck use. Less overhang, lighter weight, greater stability, shorter turning radius, more forward tilt and lower silhouette are advantages gained in this new design.

Every Baker "FT" has a *full one year warranty*—proof of our confidence in our workmanship and quality. Elements that have built the outstanding reputation for previous Baker electric trucks have been retained, and new features added. Ideal placement of hydraulic valves makes it simple to add additional valves for hydraulic attachments. All service points are conveniently accessible.

Write for complete information:

Baker®
handling equipment

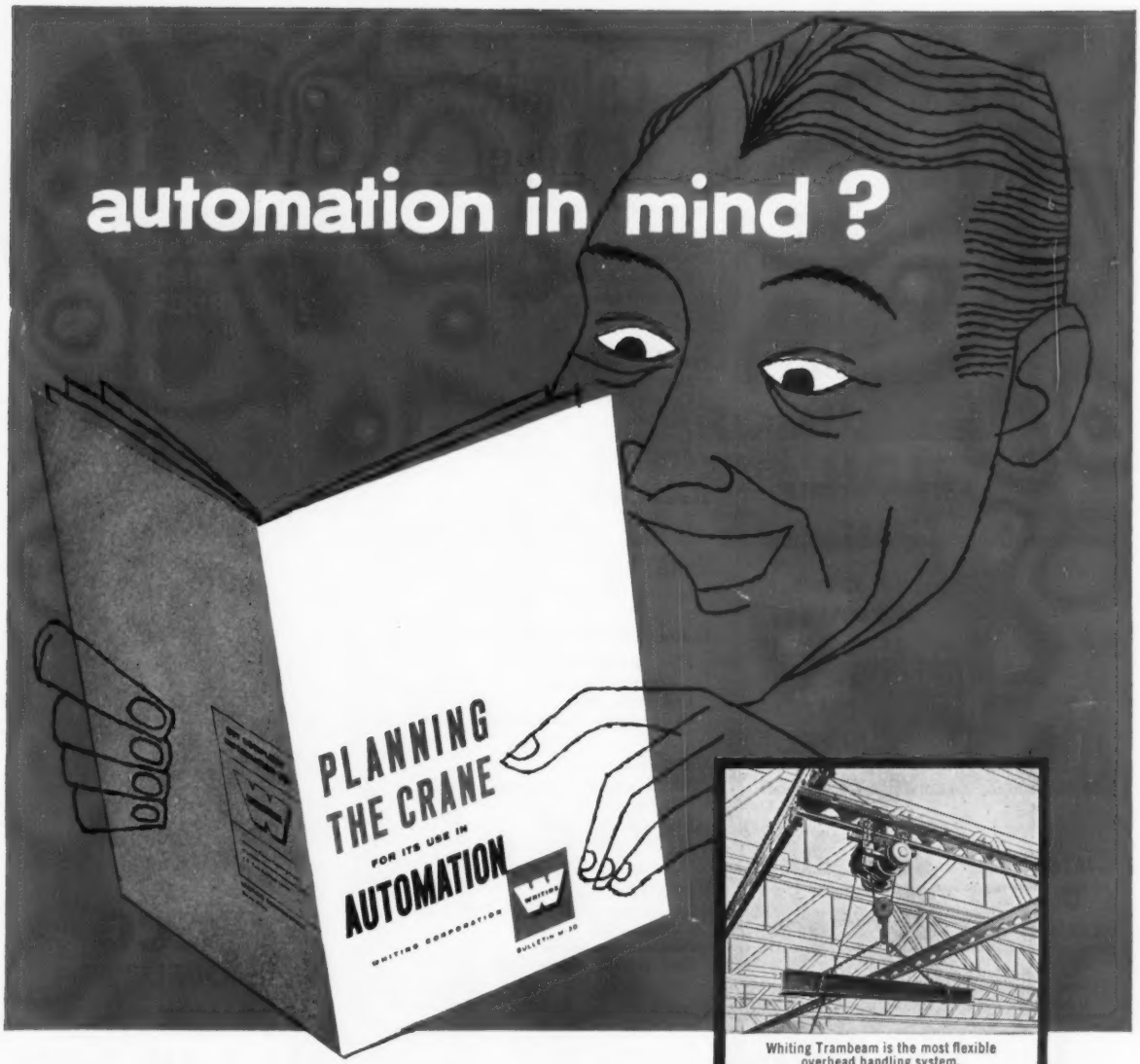
THE BAKER-RAULANG COMPANY
1209 WEST 80th STREET • CLEVELAND 2, OHIO

A subsidiary of Otis Elevator Company

5E4

Circle No. 27 on Reader Service Card for more information

automation in mind ?



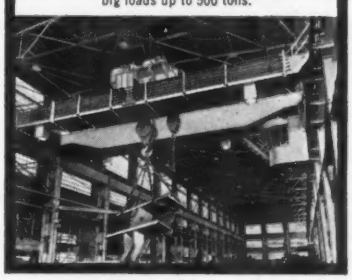
Whiting Trambeam is the most flexible overhead handling system.

PLAN TO SPEED "FLOW" WITH OVERHEAD CRANE HANDLING!

Read the Whiting just-published 12-page booklet "Planning the Crane for Its Use in Automation!" It gives important information regarding the various types of overhead cranes . . . top running, underhung, monorail and gantry. It will help you determine the best system to handle your materials or products . . . quickly, smoothly, and at lower cost. Written by a specialist with many years of practical experience in solving handling problems, it will be of interest and value to *you*. Write today for your copy of Bulletin M-30.

WHITING

Whiting Engineered Cranes handle big loads up to 500 tons.

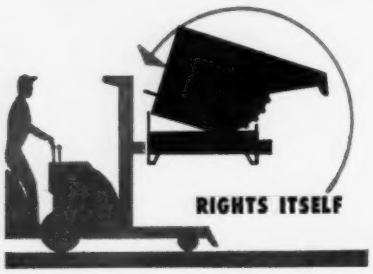


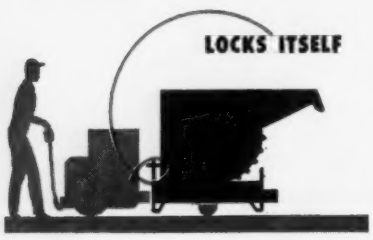
WHITING CORPORATION

15659 Lathrop Avenue, Harvey, Illinois

Manufacturer of Overhead Cranes; Trambeam Handling Systems; Trackmobile; Foundry, Transportation and Chemical Processing Equipment.

Circle No. 193 on Reader Service Card for more information





Cuts hand unloading

costs 50% or more

Figure it out yourself. Compare the cost of this one-man semi-automatic operation with the time and labor involved in hand-unloading. The answer is obvious. Hundreds of leading industries have proved it . . . and are using thousands of Roura Self-Dumping Hoppers for handling wet or dry, hot or cold bulky materials.

Roura builds 'em rugged. They're made of extra heavy gauge metal with sturdy welded joints to stand up under the terrific knocks and bangs of rough handling. Fit any standard fork or platform lift truck. Also available mounted on live skids—casters with malleable or rubber tired wheels. Sizes from ½ to 2 cubic yards.

Let Roura help *you* cut costs.

ROURA
Self-Dumping
HOPPER

WANT MORE FACTS?
We'll give you full details . . . without obligation . . . if you'll attach this coupon to your letterhead . . . sign your name . . . and mail to . . .

ROURA IRON WORKS, INC.
1411 Woodland Ave., Detroit 11, Michigan

Circle No. 158 on Reader Service Card

Calendar of Events

January 18-19, 1956
Caster and Fork Truck Manufacturers Association
New Weston Hotel, N. Y., N. Y.

January 18-21
49th Annual Exhibit
Canning Machinery & Supplies Association
Convention Hall
Atlantic City, New Jersey

January 22-24
9th Semi-Annual Meeting
National Wooden Pallet Manufacturers Association
Ellinor Village
Daytona Beach, Florida

January 23-26, 1956
Plant Maintenance & Engineering Show
Convention Hall
Philadelphia, Pennsylvania

March 5-7
5th Canadian National Packaging Exposition & Convention
King Edward Hotel
Toronto, Canada

March 28-29
2nd Connecticut Materials Handling Exposition
New Haven Arena
New Haven, Connecticut

April 3
The Material Handling Institute
Edgewater Beach Hotel
Chicago, Illinois

April 9-12, 1956
National Packaging Exposition,
Convention Hall,
Atlantic City, New Jersey

April 18-19
Caster & Floor Truck Manufacturers' Association
LaSalle Hotel
Chicago, Illinois

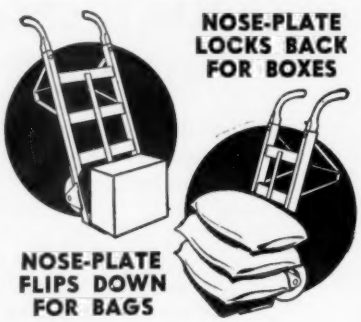
April 23-May 4
British Industries Fair
Castle Bromwich
Birmingham, England

May 14-17
Design Engineering Show
Convention Hall
Philadelphia, Pennsylvania

June 5-8, 1956
The Material Handling Institute's Exposition of 1956,
Public Auditorium,
Cleveland, Ohio

2 IN 1
PRACTICAL BOX & BAG TRUCK

DICO
MODEL "B"
COMBINATION
BOX & BAG TRUCK



20" and 22" frame widths . . . easy rolling DICO "H-D" 10"x 2.50 roller bearing wheels with molded on rubber tires.

DICO
DES MOINES 5, IOWA

ASK FOR NEW '56 TRUCK CATALOG

Circle No. 55 on Reader Service Card

There's a speedy dependable

ARO

PRODUCTION AIR HOIST *to fit your job!*

2,000 lb.
1,500 lb.
1,000 lb.
500 lb.
300 lb.
100 lb.

VARIABLE SPEED . . . 1000 lbs., 0 to 38′ per minute . . . 2000 lbs., 0 to 20′ per minute . . . load can be inched or zipped.

AIR-POWERED FOR SAFETY . . . no spark hazard . . . explosion-proof motor . . . can't burn out . . . can't overheat . . . unaffected by dust or fumes.

LIGHTWEIGHT . . . only 28½ lbs. for 1000 lb. hoist . . . 2000 lb. hoist weighs only 47 lbs. Overall length all models, 10½″ to 11⅛″.

TRY THIS WITH ANY OTHER HOIST!

You can inch so slowly that you can touch an egg without breaking it!

ARO® **AIR HOIST**

Also . . . Air Tools . . . Lubricating Equipment . . . Aircraft Products . . . Grease Fittings

SEE YOUR ARO DISTRIBUTOR

THE ARO EQUIPMENT CORPORATION

Bryan and Cleveland, Ohio

Aro Equipment of California, Los Angeles, Calif.
Aro Equipment of Canada, Ltd., Toronto 15, Ontario

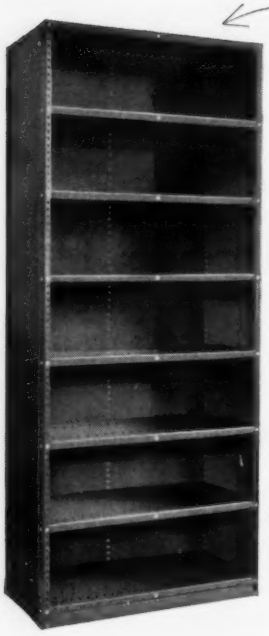
Offices in All Principal Cities

LEVER PENDENT CONTROL (illus.)

Also Push-Button or Cable Control

Circle No. 8 on Reader Service Card for more information

HOW TO USE HALLOWELL ADJUSTABLE SHELVING



SELECT THE BASIC SHELVING UNIT

USE IT INDIVIDUALLY

OR IN COMBINATION

CLIP IN DIVIDERS

PUT IN SHELF BOXES

ADD SLOPING SHELF UNITS

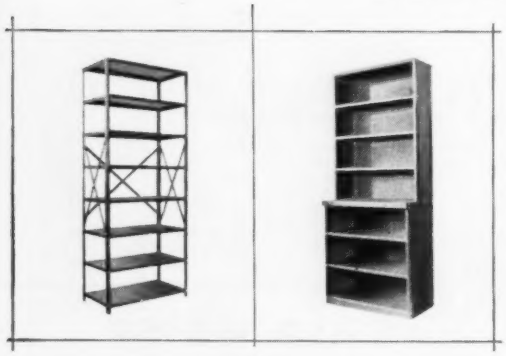
AND

BIN FRONTS

AS NEEDED

ATTACH SWINGING

OR SLIDING DOORS



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HALLOWELL SHOP EQUIPMENT DIVISION

STANDARD PRESSED STEEL CO.

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BENCHES (CABINET, WORK, UNIT) • STOOLS AND CHAIRS • SHOP DESKS • TOOL STANDS AND CABINETS • DRAWERS, DRAWER TIERS • STEEL CARTS • SHELVING

Circle No. 175 on Reader Service Card for more information

"FERRIS-WHEEL", continuous finger-type conveyor, at first floor, where portable roller conveyor sections bring cabinets from carrier for second-floor storage.

(Cover Story:) **If you're manufacturing a variety of models and want a controlled, uninterrupted flow of warehoused and in-process parts to assembly lines, don't miss any of the ingenious ideas that abound in this plant.**

Single Supply System for Separate Product Lines

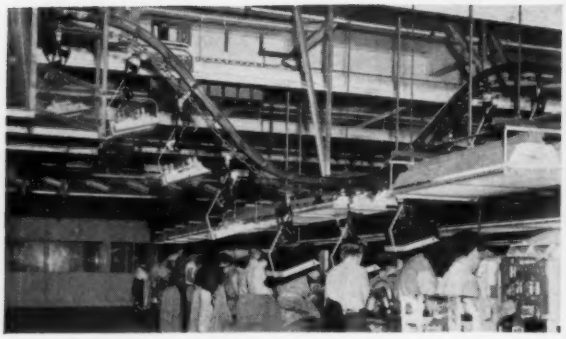
By R. H. Baddeley
Industrial Engineering Dept.,
Sylvania Electric Products,

"PLAN a manufacturing plant with capacity for assembly of 6000 TV sets per week."

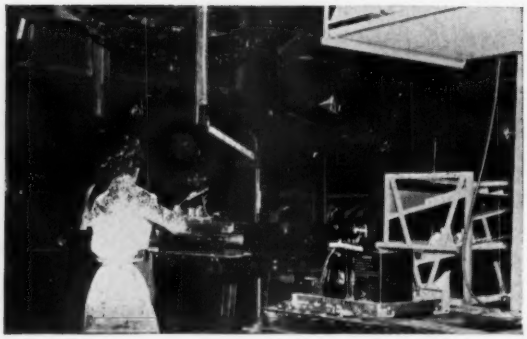
This was the assignment given to a consulting firm* and personnel of the Radio and Television Division of Sylvania Electric Products, Inc. by corporate management.

The flow patterns and equipment to implement them were first established, and then the architect was instructed to design the building to suit them. The result was a 400,000 square foot plant, located at Batavia, New York, and now producing that quantity of sets on one-shift operation—and with an ultimate capacity of four sets per minute with present facilities.

From Receiving to Shipping, this plant is designed and equipped to produce TV sets efficiently and with a minimum of manual handling. Most components are received by truck. The plant has an enclosed area capable of holding 15 semi-trailers with tractors. Four of these receiving points are equipped with hydraulic leveling ramps. Since trailers are unloaded inside the building, there is no wall between the dock and the withholding and incoming inspection areas. Walkie fork trucks are used for unloading since most material is palletized and material movement is not hindered by building obstructions. Trucking into and out of the stores area is done with reach-type fork trucks,



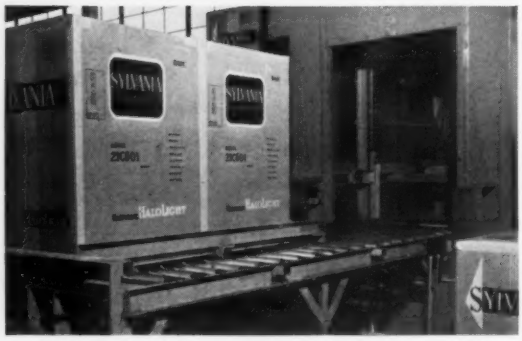
OVERHEAD conveyor brings tuners and sub-assemblies to one of eight delivery points on chassis-build line. Operator removes units color coded for her line.



ROTATING air lift at end of each chassis-build line transfers completed chassis to second overhead conveyor system, taking them to process-test section.

SINGLE SUPPLY SYSTEM

Continued



LIVE ROLLERS take cabinets from "ferris-wheel" at second floor. When two units accumulate, air-actuated bar pushes them onto inclined rollers (left).

CLAMP-EQUIPPED truck takes groups of eight to twelve cabinets from the second-floor receiving point to storage, later delivers them for final assembly.

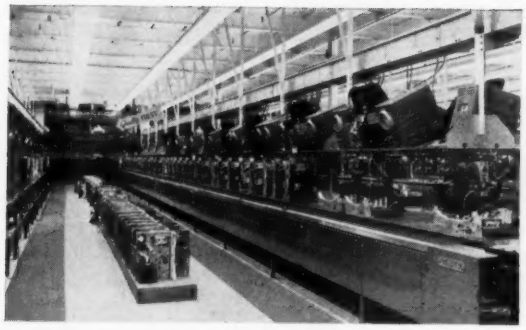
permitting narrow aisles. A rider-type fork truck and a tractor trailer system disperse material to the assembly lines.

Second-Story Storage

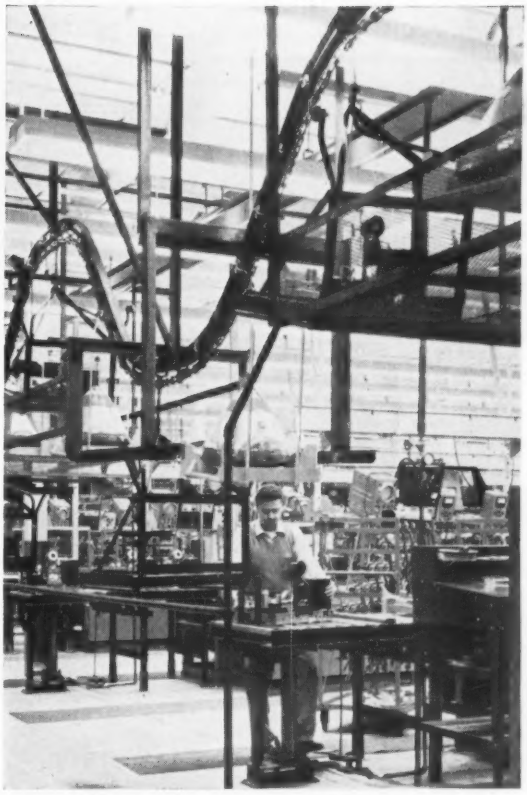
Picture tubes and cabinets are stored on the second floor. Tubes are moved upstairs by freight elevator. On the second floor, a fork truck removes them from the elevator and moves them into the storage area—and from there to the point of loading on a conveyor which carries them to the assembly lines.

Cabinets, received principally by rail, constitute practically all of the plant's rail receipts. (Two parallel railroad spurs, running into the receiving area, have capacity for four box cars. A third spur outside the building wall makes two more cars accessible.) A continuous, finger-type or "ferris wheel" conveyor is used to move cabinets to the second floor. Portable roller conveyor sections are used to connect the conveyor with the truck or box car. As the cabinets reach the convevor, a short section of power roller conveyor feeds them into the pre-load station. As the preceding carrier (there are five on the conveyor) clears the loading point, a solonoid-actuated, pneumatic cylinder tilts a portion of the live roller section and moves the cabinet into loading position. The car comes up under the cabinet, with fingers on the car passing between sections of the roller conveyor. On the second floor, the carrier deposits the cabinet onto a live roller section which carries it out of the path of the next carrier. When two units have been accumulated, an air actuated push bar moves the cabinets onto an inclined roller conveyor. From this point the

**Industrial engineering consultants were Day & Zimmermann, Inc., Philadelphia, Penn.*



PROCESS-TEST line, steel slat conveyor 26 in. wide, backed by troubleshoot bench. Sets travel, at maximum speed of 26 in. per minute, with test harness.



FOOT PEDAL operates air lift which transfers finished chassis from end of process-test line to third overhead conveyor for transport to second-floor storage area.

cabinets are picked up by grab trucks in groups of eight to twelve and moved to temporary storage.

Four Main Product Lines Coordinated

Basically, the plant has four production lines, which are divided into three functional groups—i.e. Chassis Assembly, Process-Test, and Cabinet Assembly.

Chassis Assembly:

Each chassis-build line consists of three independent belt conveyors, arranged in an "S" shape, with independent 1 HP, 6:1 variable speed drive units, and linked together with roller conveyor crossover sections. Wire mesh belting 24 inches wide is used on a steel slider bed. Combined length of the three sections is approximately 300 feet. Maximum speed is 24 inches per minute. Lower speed ranges are used for break-in periods on new models.

The "S" form was used because Design Engineering was contemplating a two-section chassis at the time that the plant was being equipped. In the event of the need for manufacture of that type of chassis, one leg of the "S" would have been used for one portion and the other two legs for the larger section. The idea of a split chassis was later discarded, but the "S" form was equally adaptable to a one-unit chassis assembly, and so it was not changed.

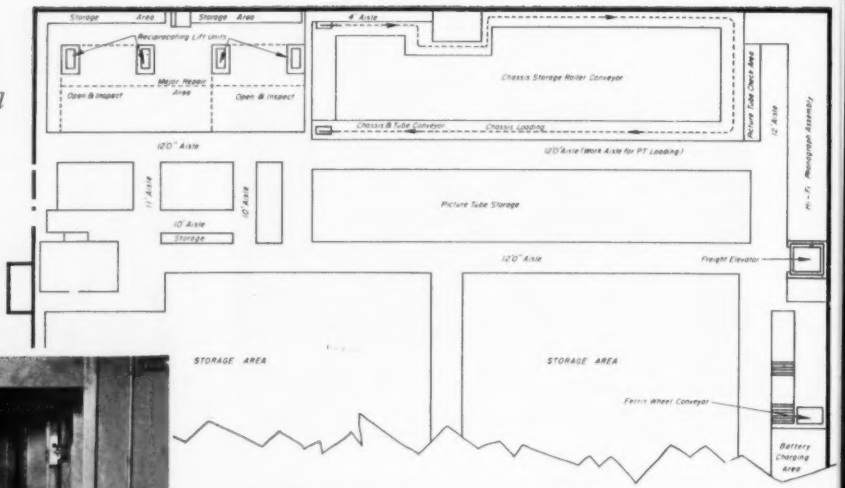
Each chassis-build line is an independent unit with tubular riveting machines—which assemble tube sockets, terminal boards, etc. to the chassis plate—arranged as an integral part of the line and operationally cycled with the line production. Material racks over the conveyor are arranged so that all material can be supplied from the back side of the line. This eliminates any interference with the operators.

Standard pans that can be hooked onto a shelf are used for most components. These shelves are bolted between perforated steel plates to allow adjustment in height and front-to-back location with a minimum

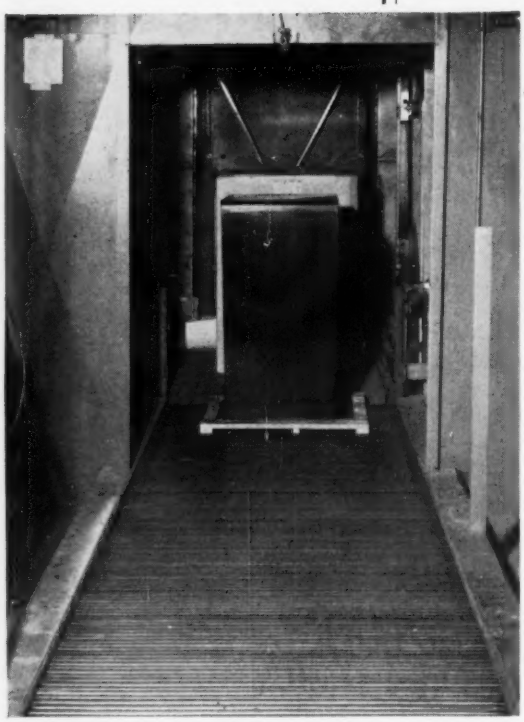
RACKS for picture tubes, made for fork truck handling, can be stacked, have removable leg sections on corners to conserve space in deadhead shipping.

SINGLE SUPPLY SYSTEM

Continued



SECOND FLOOR storage and supply areas. Orientation with first-floor flow plan, on facing page, can be obtained through inter-floor handling equipment.

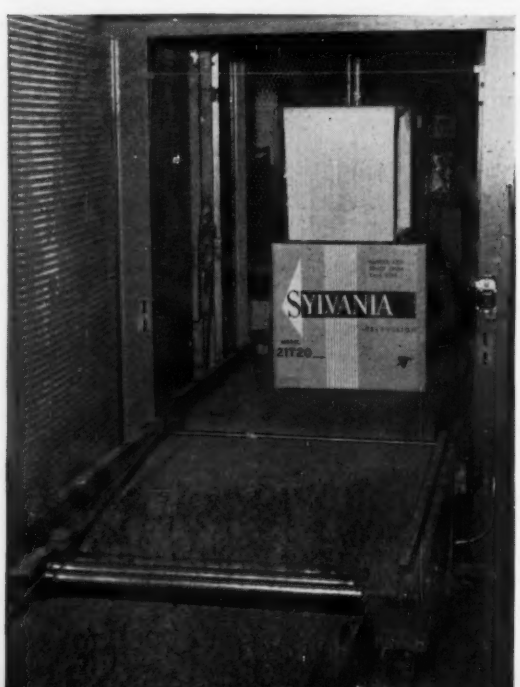


amount of time and labor. For bulkier items, such as transformers, tubes and electrolytic condensers, it has been necessary to provide special shelving and hopper-type chutes.

Tuner, high-voltage-unit and high-voltage-cover assemblies are loaded on an overhead conveyor at the point of completion in the tuner and chassis subassembly departments. They are delivered to the chassis-build lines at the points where they are assembled to the chassis. This overhead system is 804 feet long, with trolleys on one-foot centers and pan-type carriers on two-foot centers. Maximum speed is 16 feet per minute. Loading stations in the sub-assembly and tuner departments are 12 to 20 feet sections at four-foot elevation. The length of these stations allows minor rearrangement of sub-assembly operations without modification of the conveyor.

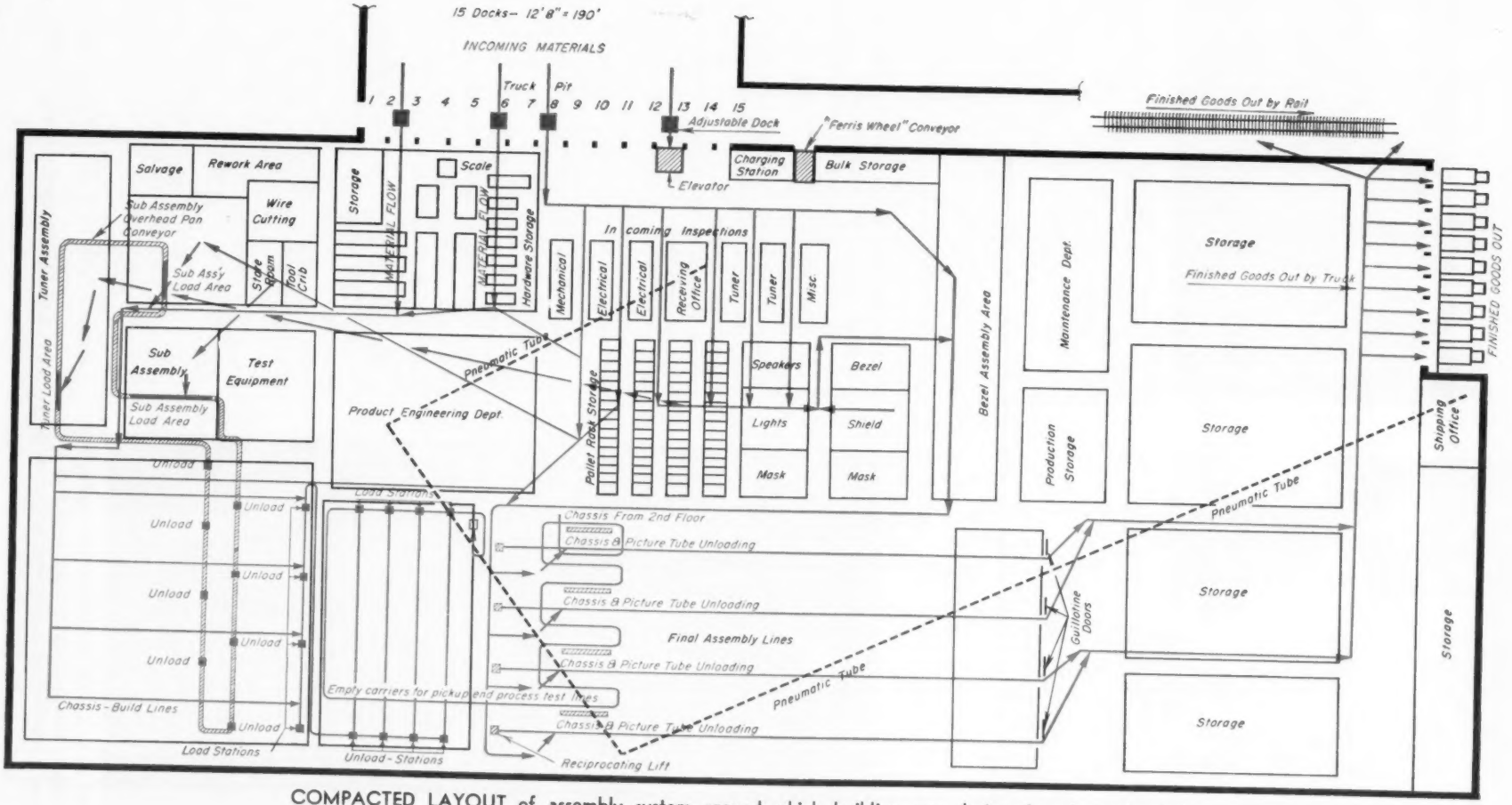
Unloading stations in the chassis assembly lines are single points at the bottom of three-foot radius curves since the belt conveyor lines are relatively permanent. A number code system from 1 to 4 is used to correspond to the chassis build line numbers, and operators removing and using units from the overhead conveyor remove only the parts designated for their particular line.

(More on page 66)



UPPER LEFT: Reciprocating lift upstairs, carton on car, ready to go down. Feeder is "slat" conveyor with rollers for cross-bars. Limit switch prevents accidents.

LEFT: Car in down position, lift is ready to discharge table model cabinet and carton onto final assembly line. Cartons provide suitable assembly work-height.



COMPACTED LAYOUT of assembly system around which building was designed and constructed.

WIRE MESH conveyor mounted at 22-in. height for final assembly but slopes down to floor level at packing operation and continues there to end of line.

ROLLER conveyor cross-over ties two conveyors together in cabinet assembly line, comprizing 30-in. wire mesh belting on 35-in. slider bed 283 ft. long.

SINGLE SUPPLY SYSTEM

Continued

FIRE DOOR over cabinet assembly line is guillotine type, with photo-cell and solenoid-operated cam system to prevent door from dropping when set is in way.

At the end the chassis assembly line, the chassis is pushed onto a roller-bed, rotating, pneumatic-lift station. It raises the chassis from the 36-inch-high line to a 48-inch elevation for loading onto the second overhead conveyor system.

Chassis move down the chassis assembly line with tuner and volume control shafts extending toward the back of the conveyor. To load them onto this second overhead conveyor—which has a carrier with a roller conveyor bed—without damage to these shafts, the chassis must be turned 180 degrees so that the shafts protrude toward the front of the carrier. (The alternative would have been reversal of the direction of travel of the overhead conveyor. This would be highly undesirable, with manual loading, because the operator would have to keep looking over her shoulder for approaching carriers.)

Elevating the loading station to 48 inches was done to keep the overhead conveyor as high as possible—and thus maintain maximum head room in aisles between belt conveyor lines without increasing the distance between these lines.

We made our layout of the chassis assembly lines first and then developed the plan for the overhead conveyor to fit this layout. The carriers are hung at an angle on the chain so that the chassis rests in the outside, back corner. To facilitate loading, carriers have rollers which ride on parallel rails at the loading stations. They keep the carrier moving level and prevent sway as the operator pushes the chassis onto the carrier.

The overhead conveyor, 492 feet long, carries chassis from Chassis Assembly to Process Test. Maximum speed is 20 feet per minute. Carriers are mounted on five foot centers on the chain. The system is powered by a HP, 6:1 variable speed drive.

(Continued on page 134)

Handling Equipment to Show Influence of Production Demand

R. H. Davies

1955 President of the Material Handling Institute and Vice President, Industrial Truck Div., Clark Equipment Co.

It's going to be a good year for all people connected with material handlings, says the retiring MHI President, as he tells how manufacturers of material handling equipment, across the board, are readying new designs and constructions to meet anticipated needs.

WITH the increased concern about rising costs of materials and labor, manufacturers are looking more and more to material handling equipment as the means of increasing production, decreasing costs, and making maximum use of existing space and facilities.

The 1956 outlook for all those in material handling is good, at least for the first half of the year. This optimism is based on the upward trend of certain lead factors, such as capital investment in new plants and heavy equipment. It is also based on the fact that 1956 may be the year in which we will face a labor shortage, at the same time that many manufacturers will be striving for increased production in existing facilities. Both of these factors will necessitate increased mechanization in material handling.

Material handling equipment manufacturers are placing emphasis on safety, speed of handling, rate of travel, versatility of equipment and the development of specialized equipment for 1956.

Significant Trends in Equipment Development

Two important trends are becoming more and more prominent in the material handling field. The first is the increased emphasis on unit loads and potential savings realized through them. The second is increased emphasis on making maximum use of cubic space.

Across the board, there are significant trends in each of the basic material handling equipment fields.

Hoist manufacturers are making tremendous progress in the design and construction of equipment. Buyers are better acquainted with their application needs and are more selective in their buying. Some M.H.I. members report users talking in terms of cost per minute and seeking equipment that will permit moderate investments to increase productivity, lower costs, and enable them to be more competitive. There is considerable interest in power propulsion and dispatching-type systems.

Floor trucks are being built to handle larger loads. Equipment under development will be more versatile and more adaptable to available operating space.

In the industrial lift truck field, the trend is toward automatic transmissions, power steering, faster load-lifting speed, and increased interest in special permanent and exchange attachments. Both electric and gas trucks are in good demand, with a number of manufacturers offering LP-gas conversion equipment and trucks initially equipped for LP-gas. There is a definite trend toward more space-savings, with narrow-aisle tiering trucks and higher stacking trucks gaining more prominence every day.

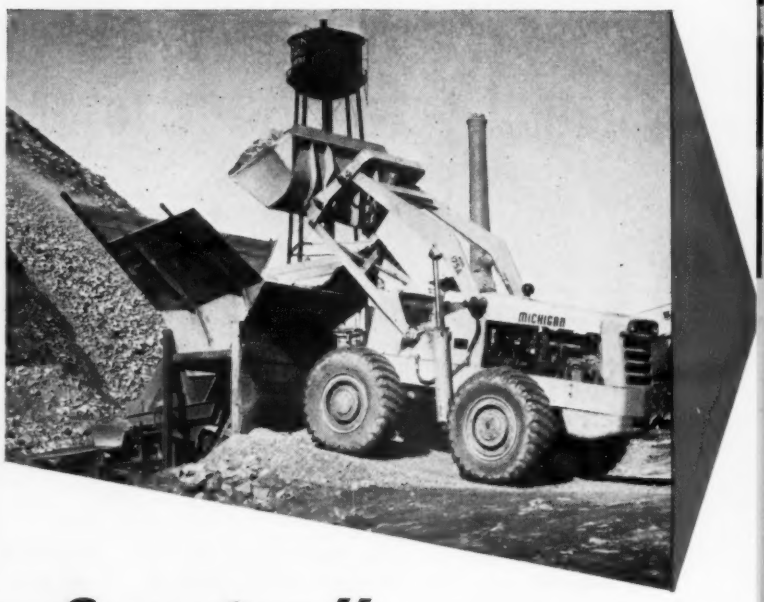
In the battery field, improvements are aimed at increasing capacity and working life. Emphasis is on maximum kilowatt-hour capacity and minimum space.

Conveyor manufacturers report a stepped-up pace that will undoubtedly continue through the early part of 1956. Many engineering layouts and estimates are in the hands of companies contemplating early 1956 purchases of large conveyor systems integrated with fully automatic production lines. There is a trend toward closer engineering cooperation between conveyor manufacturers and machine-tool builders.

Pallet and rack manufacturers are producing equipment that is necessitated by the increased interest in maximum utilization of cubic space. Racks with movable shelves and other special designs are in demand.

Material handling equipment is one of management's profit tools. Each day more responsibilities are placed on industry to produce more income. More income is distributed to employees and more is needed for expansion programs to insure employment and maintain high production while maintaining a fair return on invested capital. Management is becoming more aware of the high-cost handling still practiced in many fields and of the savings possible through integrated material handling systems. That is why material handling equipment manufacturers are optimistic about the outlook for 1956.

FEEDING hopper of belt conveyor to crusher is essential "fill-in" job.



TRACTOR SHOVEL

on "Shuttle Service" Handles Tremendous Tonnage

HANDLING over a thousand tons of bulk per day —with travel distances ranging up to 250 yards —is normal operation for a front-end loader working at Warren Foundry & Pipe Co., of Dover, N. J.

It loads delivery trucks at six locations, supplies a crusher "between trips", and, in addition, helps in miscellaneous handling jobs where and when required. The firm does not consider it unusual for the equipment to load out about 70 trucks during a 7½-hour shift, while meeting demands of the crusher. The loader has a capacity of 2¼ yards and is equipped with hard-rock, lug tires to resist the wear caused by the highly abrasive materials over which it travels.

Warren Foundry processes six "sizes", or grades, of crushed rock—2½-inch, 1½, 1, ¾, and ¼. Grit and mill sand are also products of the crushing operation.

The front-end loader hauls rock from the crude stockpile (accumulated by belt conveyor) to a large hopper. This feeds another belt conveyor leading to the crushing machinery. After crushing and screening, the rock is deposited, according to size, in hopper-bottom bins.

The grit and mill sand are washed down pipes leading from the crusher to ground level. There the material is allowed to accumulate for loading by the tractor-shovel into trucks which carry it to stockpiles.

The crushed rock is fed directly into yard haulers (trucks) from the bin hoppers. It is then stocked, according to size, in piles as high as 20 feet.

It is at these piles that the tractor-shovel does most of its work, loading customers' trucks. Each is filled, on the average, with four passes and in three minutes. Trucks normally take between 11 and 12 tons.

The crusher hopper requires filling about every 15 to 20 minutes, and so the loader is constantly shuttling between the area of the yard stockpiles and the crude stockpile, a distance of some 200 yards.

The following analysis of the work of the shovel-loader during one shift has been somewhat condensed, but it still shows how the equipment works and, in general, coordinates the yard activities.

LOADING customers' trucks from stockpiles takes average of 4 passes and 3 minutes with 2¼-yard bucket.

Detail of One-Shift Operation

7:00 A.M.	Servicing and quick check-up of loader.
7:30 to 8:30	Clears out trench leading away from grit and sand pipe. (Material produced during night shift accumulates around end of pipe and must be removed every morning.)
8:30 to 9:30	Load one truck with mill sand. Drive 250 yards to stockpile; load one truck. Drive 40 yards to 2½-yard stockpile; load one truck. Drive 80 yards to 1½-inch stockpile; load two trucks. Drive 80 yards to 2½-inch stockpile; load one truck.
9:30 to 10:30	Drive 150 yards to crude stockpile; fill hopper. Return to 2½-inch pile; load two trucks. Drive 40 yards to grit pile; load two trucks. Drive 250 yards to mill sand pile; load one truck. Drive 200 yards to crude pile; fill hopper. Drive 180 yards to 1½-inch pile; load two trucks. Drive 80 yards to 2½-inch pile; load three trucks
10:30 to 11:30	Return to crude pile; fill hopper. Drive 200 yards to mill sand pile; load one truck. Return to crude pile; fill hopper. Drive 130 yards to grit pile; load one truck. Return to crude pile; fill hopper. Drive 180 yards to 1½-inch pile; fill one truck. Drive 80 yards to 2½-inch pile; load one truck. Return to crude pile; fill hopper.
11:30 to 12:00	Drive 100 yards to grit pipe; load two yard trucks. Return to crude stockpile; fill hopper. At crude pile; fill one truck.
12:00 to 12:30	Lunch
12:30 to 1:00	Move heavy spray tank in yard. (Tank manually rolled into bucket.) Return to crude pile; fill hopper.
1:00 to 2:00	Drive 200 yards to mill sand pile; load one truck. Drive 250 yards to grit pile; load one truck.

(More on page 168)

SAVINGS have been gained in operating time and vehicle maintenance, and accidents have been reduced, since the equipment-operator control program began.

CRANE LUBRICATION AND MAINTENANCE CHART

VEHICLE #.....DATE.....HOUR METER READING.....COSTS:

☐ 50 Hour Service ☐ 100 Hour Service Lubrication—man hours.....

☐ Check air-cleaner	☐ Clean & re-oil. Amt. used.....
☐ Check motor-oil condition	☐ Change oil ☐ Add Amt. used..
☐ Check trans. grease level	☐ Change oil ☐ Add Amt. used..
☐ Check diff. grease level	☐ Change oil ☐ Add Amt. used..
☐ Check steering-box, rear	☐ Change oil ☐ Add Amt. used..
☐ Check hoist worm gear case:	☐ Change oil ☐ Add Amt. used..
☐ Lubricate hoist clutch bearings:	☐ Adjust clutch, Man hours.....
☐ Lubricate trunnion steering shaft:	☐ Adjust chain)
☐ Lubricate trunnion bearings:	☐ Adjust)
☐ Lubricate front steering gears	☐ Man hours.....
☐ Lubricate propeller shafts	☐
☐ Lubricate rollers & shafts on boom	☐
☐ Oil all rod and pins, joints	
☐ Check air in tires	
☐ Check battery electrolyte	☐ Re-charged ☐ New.....
☐ Check radiator water level	☐ Drain. Add water; anti-freeze....
☐ Check clutch pedal freeplay	☐ Adjust.....
☐ Check brakes for pedal	☐ Adjust minor ☐ Major. Hrs.....
☐ Lubricate distributor cam	☐ Felt ☐ Gears Hrs.....
☐ Check distributor points	☐ Adjust. Parts.....
☐ Check generator	☐ Parts.....
☐ Check carburetor	☐ Parts.....
☐ Check brake master cylinder	☐ Parts.....
☐ Check brake wheel cylinder	☐ Parts.....
☐ Check brake fluid cylinder	☐ Added amount used.....
☐ Check brake fluid lines	☐ Parts.....
	☐ Man hrs. on cylinders—lines....
☐ Check spark plugs	☐ Clean & set ☐ New No. used..
☐ Tighten all loose bolts & nuts	☐ Check axle studs ☐ Wheel nuts

Additional work done or needed; parts used and/or man hours:

If you want to get more and longer use from your industrial vehicles, see how . . .

Controls Raise Productivity,

AUTOMOBILE, TRUCK or TRACTOR MAINTENANCE & LUBRICATION CHART

NAME OF OPERATOR OR VEHICLE NUMBER: ..... DATE ..... LICENSE # ..... MAKE ..... MODEL ..... MILEAGE or HOUR METER READING ..... LUBRICATION MAN-HOURS Grease value ..... $.....

☐ Check air-cleaner	☐ Clean & re-oil. Amt. used
☐ Check motor-oil condition	☐ Change Oil ☐ Add Amt. Used.....
☐ Check trans. grease level	☐ Change Oil ☐ Add Amt. Used.....
☐ Check diff. grease level	☐ Change Oil ☐ Add Amt. Used.....
☐ Check steering box level	☐ Change Oil ☐ Add Amt. Used.....
☐ Check hyd. steering oil	☐ Change Oil ☐ Add Amt. Used.....
☐ Check oil filter condition	☐ Replace Element #.....
☐ Check oil filter lines	☐ Parts Used.....
☐ Lubricate all pressure fittings	
☐ Lubricate water pump (if grease type)	
☐ Lubricate propeller shaft (if grease type)	
☐ Lubricate distributor rotor felt	
☐ Lubricate distributor cam	
☐ Lubricate distributor gears	
☐ Oil brake linkage	
☐ Oil all rod-ends & pins	
☐ Oil carburetor & other linkage	
☐ Oil generator bearings	
☐ Oil starter bearings (unless self-lubed)	
☐ Oil door hinges	
☐ Oil hood hinges & linkage	
☐ Wax door dove-tails and wedges	
☐ Apply kerosene & graphite to throttle & exhaust-valve shafts	
☐ Check air in tires	☐ Replace with new ☐ Used.....
☐ Check battery electrolyte	☐ Replace with new ☐ Used.....
☐ Check radiator water level	☐ Drain ☐ Add Water ☐
	☐ Flush ☐ Anti-freeze.....
☐ Check clutch pedal free-play	☐ Adjust Hours.....
☐ Check brakes for pedal	☐ Adjust minor ☐ Major Hrs.....
☐ Check brake master cylinder	☐ Replace ☐ New ☐ Used.....
☐ Check brake wheel cylinder	☐ Replace ☐ New ☐ Used.....
☐ Check brake fluid cylinder	☐ Added Amount Used.....
☐ Check brake fluid lines	☐ Parts Used.....
☐ Check to see that lights burn	
☐ Check operation of horn	
☐ Check operation of wind-shield wiper	

Additional work needed or done, parts used, and/or man-hours:

ELECTRIC Steel Foundry Company, Portland, Ore. has developed a new and unique equipment-operator control program that has achieved considerable savings in operating time and vehicle maintenance. Accidents have also been reduced to a minimum with the plan, which is applicable to any firm using several industrial trucks. Particularly significant is Esco's mobile equipment department which transports great tonnages of finished castings and raw materials.

Included in the company's line of diversified products are castings for the construction, logging and chemical industries, the molding of which requires a vast amount of raw materials and foundry sand. For example, to produce one ton of finished castings, seven tons of sand are required, and Esco uses more than 6000 tons of sand each month. The firm's material handling and yard equipment consists of a total of 16 units, all controlled by Bert Mansfield, equipment-operator supervisor and originator of the new plan.

First step in the program was the licensing of operators. More than 120 men had been operating the equipment, but after a written examination this group was cut to 70, each of whom is required to wear a badge while driving. (The test was compiled from the Hyster booklet "How to Operate a Lift Truck", covering operating techniques and safety measures.) In addition to a badge, each driver is assigned an

FORK LIFT TRUCK LUBRICATION & MAINTENANCE CHART

VEHICLE #.....DATE.....HOUR METER READING.....COSTS:

☐ 50 Hour Service ☐ 100 Hour Service. Lubrication—man hours.....

☐ Check air-cleaner	☐ Clean & re-oil. Amt. used.....
☐ Check motor-oil condition	☐ Change oil ☐ Add Amt. used.....
☐ Check trans. grease level	☐ Change oil ☐ Add Amt. used.....
☐ Check diff. grease level	☐ Change oil ☐ Add Amt. used.....
☐ Check steering-box, rear	☐ Change oil ☐ Add Amt. used.....
☐ Check steering-box, front	☐ Change oil ☐ Add Amt. used.....
☐ Check hydraulic oil level	☐ Change oil ☐ Add Amt. used.....
☐ Check oil-filter condition	☐ Filter lines. Parts.....
☐ Replace oil-filter element	☐ Part No.....
☐ Lubricate propeller shaft	☐ Replace shaft part No.....
☐ Lubricate trunnion zerk ftgs.	☐ Check for play.....
☐ Lubricate trunnion rollers	☐ Adjust chain ☐ bearings
☐ Lubricate upright rollers	☐ Adjust chain ☐ bearings
☐ Lubricate tilt cylinder	☐ Tightened; repacked. Parts #.....
☐ Check hoist cylinder	☐ Tightened; repacked. Parts #.....
☐ Oil all rod-and-pins, joints	
☐ Check air in tires	☐ .....
☐ Check battery electrolyte	☐ Re-charged. ☐ New.....
☐ Check radiator water level	☐ Drain. Add water; anti-freeze.....
☐ Check clutch pedal freeplay	☐ Adjust
☐ Check brakes for pedal	☐ Adjust minor. ☐ Major. Hrs.....
☐ Lubricate distributor cam	☐ Felt
☐ Check distributor points	☐ Adjust. Parts.....
☐ Check generator	☐ Parts.....
☐ Check carburetor	☐ Parts.....
☐ Check brake master cylinder	☐ Parts.....
☐ Check brake wheel cylinder	☐ Parts.....
☐ Check brake fluid cylinder	☐ Added Amount used
☐ Check brake fluid lines	☐ Parts.....
☐ Check spark plugs	☐ Clean & set. ☐ New; No. used.....
☐ Tighten all loose bolts & nuts	☐ Check axle studs. ☐ Wheel nuts.....

Additional work done or needed, parts used and/or man hours:

EXAMINATION FOR YARD EQUIPMENT OPERATORS
Part I

Name: ..... Date: .....

Mark the following questions "Yes" or "No"

NO YES 1. If you are operating a yard vehicle twice as fast as a person walking, are you traveling at the correct speed?

NO YES 2. The lifting capacity of a lift truck is determined by the distance from the front axle to the center of the load.

NO YES 3. The rated capacities of fork trucks should not be reduced when traveling over uneven surfaces or down grades.

NO YES 4. When the boom of the Karry Krane is in the highest position the rig will lift the maximum load.

NO YES 5. Excessive speeding of the engine will increase the speed of the hoisting mechanism.

NO YES 6. Drivers should not slow down at corners or cross aisles only sound horn.

NO YES 7. Brakes should be tested before beginning operation at the beginning of the shift and before attempting unusual loads.

NO YES 8. Drive with your foot on the clutch at all times.

NO YES 9. To conserve time, leave the motor running as you leave vehicle to run down your foreman.

NO YES 10. Horizontal, vertical and side vision are equally important in the operation of plant vehicles.

Lower Maintenance Costs

operator's card which must be filled in at the end of the shift. Indicated on the card is the-hour meter reading at the start and end of the shift, plus data regarding the condition of the vehicle. When the operator checks out, the badge and repair card are turned in to the supervisor, who enters the information on a master sheet from which he can see: 1) How long each vehicle is operated; 2) Where each vehicle is operated; 3) How many men have operated the vehicle.

The operators' cards also serve as guides to the maintenance department in deciding when the vehicles should be placed in the repair shop. Also, a special repair sheet has been designed for control of parts, repairs and servicing in the maintenance shop. To date, a saving of eight man-hours per day has been realized in the maintenance department alone since establishment of facts and figures on equipment maintenance.

After information was compiled from the operators' cards and the maintenance chart onto a master sheet, it was apparent that certain units were not working to full capacity. Some equipment was channeled to other operations, and it was possible to cut down the total number of vehicles required.

The data also reveals any need for additional units. Although comparatively new, the control system is already paying good dividends.

Data and photo courtesy Hyster Company.

EXAMINATION—Part 2

MULTIPLE CHOICE—MARK ONLY THE CORRECT ANSWERS

1. To start traveling the shift should be in:
   ☐ Low Gear ☐ 2nd gear ☐ 3rd gear ☐ High
2. If the tires are low, the driver should:
   ☐ Drive it to get all the wear possible
   ☐ Go immediately to garage for air
   ☐ Try to tighten valve core
3. If a vehicle has a flat tire, the driver should:
   ☐ Drive immediately to garage for repairs
   ☐ Look for supervisor and report it
   ☐ Park vehicle and call man from garage to repair
4. Driving with your foot on the clutch pedal will cause excessive wear to the:
   ☐ Clutch pedal
   ☐ Hoisting mechanism
   ☐ Throw-out bearing and fly wheels
5. If load obstructs the forward view when driving forward, the operator should:
   ☐ Drop load and remove top articles
   ☐ Hang head outside to see around load
   ☐ Stop, turn around and go the same way in reverse
6. In creeping forward to pick up load it is always better to:
   ☐ Shift into low gear ☐ Ride the brake
   ☐ Stay in higher gear and slip clutch
7. If the rear wheels of the vehicle raise off of the ground when lifting the load, the operator should:
   ☐ Refuse to pick up the load
   ☐ Get several men to stand on counterweight
   ☐ Try to reduce the load to be carried at one time
8. When picking up a load with the crane it will be safe to:
   ☐ Just get the point of the hooks into a small hole
   ☐ Wrap the main line around the load
   ☐ Use chains or slings
9. It is never permissible to carry a rider on a:
   ☐ 20 Lift Truck ☐ 75 Lift Truck ☐ Yard Crane
10. If you are operating a vehicle and traveling twice as fast as a person walking, and the surface is wet or rough, you are traveling:
    ☐ Too slow ☐ Too fast ☐ About the correct speed

Power and Control
For Automatic Handling ... Part 1

As mechanization of operations increases, more use is being made of electric drives and control systems for material handling. This section deals, for the most part, with feedback, or "closed cycle", systems. The conclusion, in February Flow, will discuss automatic control and programming in sequential, or "open cycle", systems

INDUSTRIES have found it is economical to use electric power to do much of the work in their factories. They have learned that, where manpower can be replaced or complemented with electric power, almost inevitably there is a reduction in manufacturing cost. As a result, the growth of industry, in general, has been closely paralleled by the growth of the electrical industry. For example, the average annual power used by each production worker increased from 10,750 kilowatt hours in 1946 to 16,350 kilowatt hours in 1953. Furthermore, it has been predicted that the consumption of power will double in the next decade.

Assuming that productivity will increase somewhat in the same proportion, then output per man-hour of production worker must increase—since it is certain that the number of production workers will not double in ten years. In other words, we must achieve this higher productivity by improving our efficiency.

In recent years, a great deal has been written about the so-called "automatic factory," in which, presumably, there no longer would be any need for workers—or even management—since all of these people would be replaced by computers and machines. This, of course, is someone's pipe dream, and the author cannot share this optimism or pessimism, as you choose to call it. Certainly, it is expected that much monotonous physical labor will be eliminated, but by the same token, quality and skill of labor required will be higher.

The trend to automation is a progressive movement and not one which will take place overnight. Automation is apt to be expensive. It is not merely a matter of buying a new piece of equipment but requires carefully planned coordination of the manufacturing system and frequently the product. Obviously, industries are going to be willing to make large investments in the progressive automation of their operations only if investigation shows that such investments are economically justified by resulting reduced costs. Many industries have already become convinced of these benefits and are actively engaged in the progressive automation of their operations. Further investigations will undoubtedly show that other industries can economically justify progressive automation of operations.

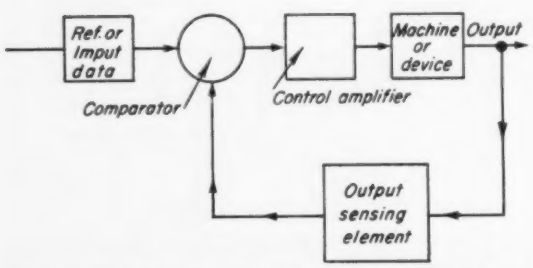


FIG. 1: Block diagram of simple, closed-loop feedback system. Other systems may have combinations of loops.

Coupled with the trend to automation and automatic control will be an increasing use of electric drives and electric control systems. Motive power is no longer the only requirement. Increasing emphasis is being placed upon measurement of various signals such as speed, torque, power, temperature, pressure, light, etc., and the translation of these signals to control the drive in a prescribed manner. Feedback control, or self-regulation, is becoming increasingly important as accuracy and quality requirements become more rigid. Electricity and electric drives lend themselves particularly well to such systems. In a great majority of cases, these systems can be made up from standard components coordinated to give the desired end result.

Feedback Control—Self-Regulating System

A feedback system is one which measures its own performance, and when it senses an error in this performance, transmits a feedback signal back to automatically correct the output. In other words, a feed-

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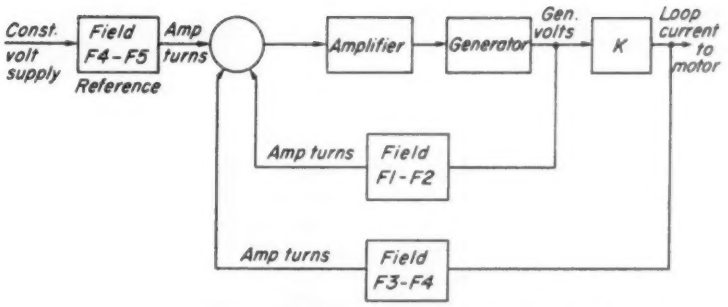

FIG. 3: Basic diagram for voltage regulator with current limit—relatively low-cost, adjustable speed control.

back system is a "self-regulating" system. "Cybernetics" is a term which has been devised in recent years to denote the science or technology of feedback control. It has, however, come to have a much broader meaning. In fact, it has been given such broad and varied meanings that it is almost impossible to arrive at a simple, conclusive definition of the word.

For this reason, we choose to refer to such self-regulating systems as "feedback control" rather than "Cybernetics," which might mislead the reader.

Feedback control is not a new idea. For example, a flyball governor represents an almost ancient feedback system with which we are all familiar. Another example of feedback control is the control for the heating system in your home. In this case, the setting of the thermostat is the reference which establishes the required output. The feedback unit is the temperature sensing device in the thermostat which measures the output, or temperature, of the room. When there is an error between room temperature and the reference, a signal is sent to the furnace to add more heat, or to shut off the heat, to correct the temperature of the room. This system, of course, is bi-directional only if we have the *cold* outdoor atmosphere to provide the cooling effect when the furnace shuts off. To make the system a bi-directional system on a year-round basis would require the addition of a refrigerating unit—to allow correction in either direction, regardless of outdoor conditions.

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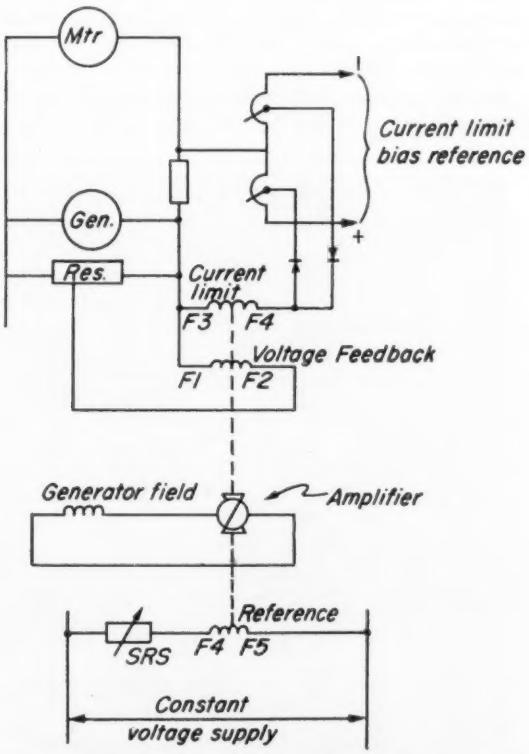

FIG. 2: Schematic of adjustable-voltage, d-c drive, with voltage regulator and current limit control.

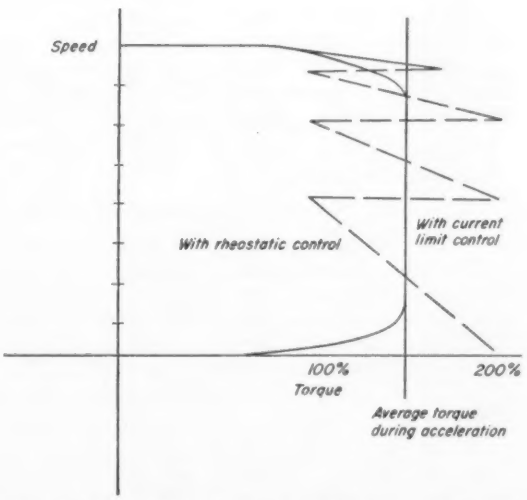

FIG. 4: Current limit control eliminates torque peaks usually encountered with normal rheostat control.

Continued

A feedback system is a closed loop system. Referring to Fig. 1, let us fit your heating system into this diagram. The setting of the thermostat is represented by the box identified as the reference. The comparator is the entire thermostat unit which compares the reference to the temperature sensing device to operate a contact. The control amplifier represents the fuel control and blower control on the furnace. The block designated as the machine is the furnace, and the output sensing element is the temperature sensing element in the thermostat. This, of course, is a feedback system in its simplest form, but all feedback systems can be described by such a loop or combination of loops.

There are literally thousands of types and varieties of feedback control in use in industry today—from the simple, centrifugal, governor control to the most complex regulating systems used on steel rolling mills and paper machines.

To illustrate the growing use of feedback control, we will describe several types of feedback control which are most common to material handling applications.

Voltage Regulator With Current Limit:

Adjustable-voltage, d-c drives, with voltage regulator and current-limit control are most widely used on heavy material handling applications—such as ore bridges, coal towers, car dumpers, skip hoists, and barge hauls. Figure 2 is a simplified, schematic, electrical diagram typical of such a drive. Speed of the drive is approximately proportional to generator voltage, which, in turn, is determined by the degree of excitation of the generator. In the specific example, the amplifier supplies excitation power to the generator field. Therefore, it can be seen that the excitation of the reference field (F4-F5) of the amplifier determines the voltage level at which the generator will operate. Deviation from this voltage causes more or less current to flow in field F1-F2, as the case may be—thereby correcting generator excitation to hold the desired voltage as determined by excitation of reference field F4-F5. The operator controls the excitation of reference field F4-F5 by means of the adjustable resistor, SRS, thereby providing adjustable speed control from zero to maximum speed.

In addition it will be noted that there is a resistor in the armature circuit of the motor and generator. The voltage drop across this resistor provides a signal which is proportional to the current in the loop. This signal is fed back and compared to the current limit bias reference. If the current limit signal exceeds the current limit bias reference, current will flow in amplifier field F3-F4 in such a direction as to correct generator voltage, thereby limiting current. If motor field excitation is held constant, current limit becomes essentially *torque limit*, which is a very desirable feature on many drives.

Under normal, steady-state conditions the voltage regulator is the controlling function, and there is no

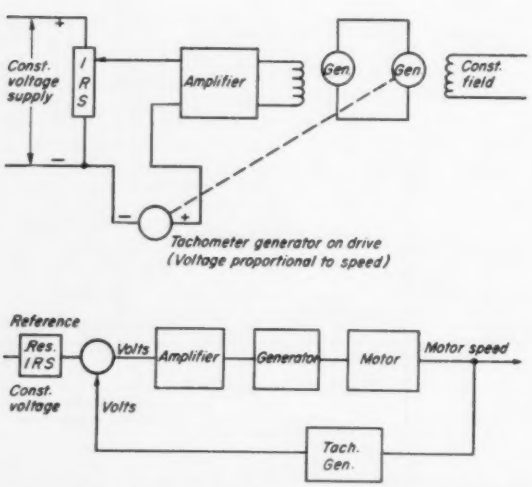

FIG. 5: Tachometer feedback control system and block diagram for accurate speed regulation of drive.

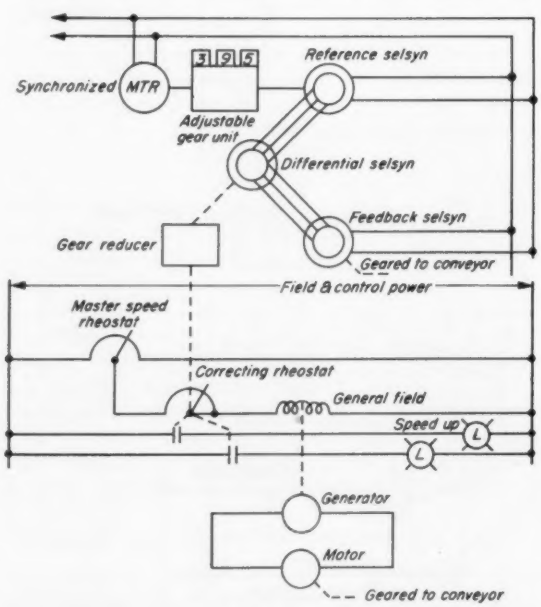

FIG. 6: Selsyn production control—simple, inexpensive system for precise control of production conveyors.

current limit feedback. During transient conditions, the current limit feedback comes into play to override the voltage regulator when the current limit setting, as determined by the bias setting, is reached. The basic block diagrams for a voltage regulator with current limit is shown in Fig. 3.

The voltage regulator provides a simple, relatively low-cost means of obtaining adjustable speed control with good speed regulation characteristics. The current limit control provides smooth, rapid acceleration of the drive by obtaining maximum torque from the drive during the accelerating or decelerating period—eliminating the usual torque pulsations encountered with the normal rheostatic type of control.

As can be seen from Fig. 4, the current limit control provides the same average accelerating torque from the drive, but it eliminates the sharp, high torque peaks which cause mechanical shock to the drive.

Therefore, on high-capacity equipment such as ore bridges, coal towers and skip hoists, where the drive is called upon to accelerate and decelerate frequently, maintenance expense may be reduced appreciably.

In addition, records prove that the elimination of the power loss in the accelerating resistors of a rheostatic control and utilization of pumpback power often result in a very sizeable saving in power costs. The net saving in maintenance and power costs is frequently sufficient to offset the added initial cost in a very short time.

Current limit control is also a standard feature on many of the small electronic drives frequently used on adjustable-speed, production-type conveyors.

Tachometer Feedback:

Tachometer feedback control is used where accurate speed regulation of the drive is essential. For example, a typical application for a speed regulator, or tachometer feedback, system is on a conveyor carrying painted parts through drying and baking ovens. By accurately controlling the speed of the conveyor, each part remains in the oven for exactly the correct amount of time. There are, of course, many other processes which require accurate speed control and warrant the use of speed regulators. A schematic of a typical speed regulator and its fundamental block diagram are shown in Fig. 5.

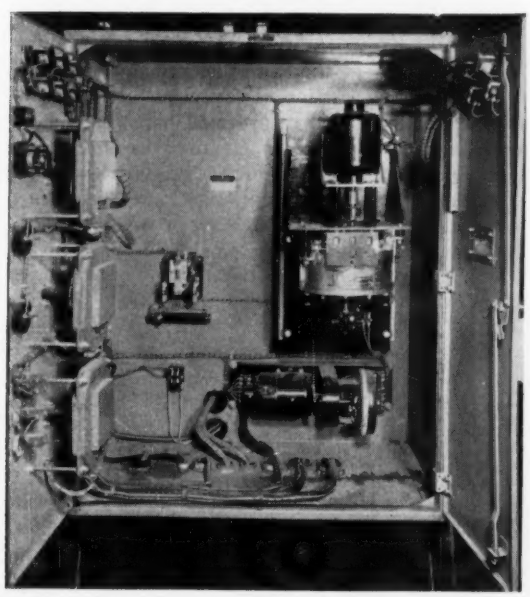

FIG. 7: "Reference selsyn assembly" and "differential selsyn and correcting rheostat assembly" in panel.

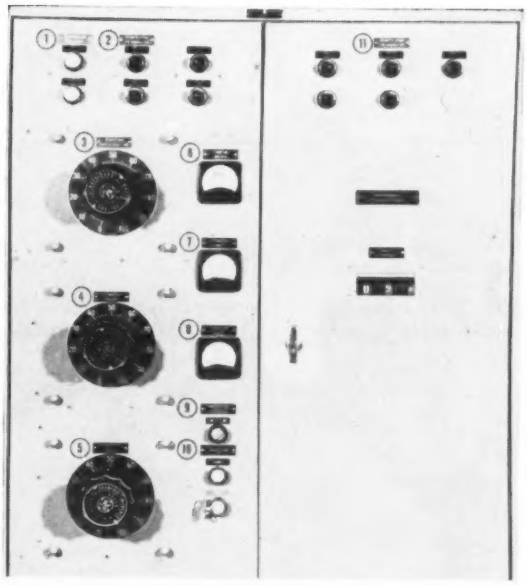

FIG. 8: Front panel of control shown previous column. (1) Correcting rheostat top—upper limit, bottom—lower limit; (2) Remote stop push-button indicators, one identified with each emergency push-button on conveyor line; (3) Conveyor speed in hooks-per-hour; (4) No. 1 Motor speed trimming dial; (5) No. 2 Motor trimming; (6) Elapsed time of conveyor run; (7) No. 1 Motor amps.; (8) No. 2 Motor amps; (9) Production (rate) Control "Off" and "On" (10) Conveyor "Start" and "Stop" (main switch); (11) indicators as in (2) above. Remaining items are conveyor designator and hooks-per-hour plate and counter, showing 160 here.

Selsyn Production Control:

In recent years, some industries have found it is desirable—if not almost imperative—to control their production conveyors in such a manner that an *exact* number of units is produced per hour. It is desirable to obtain maximum output of the production line without exceeding the maximum production rate allowed by labor regulations.

The first reaction is to put a speed regulator on the conveyor or conveyors. However, closer inspection often shows that such a scheme is not the most practical solution to the problem. For instance, if it is de-

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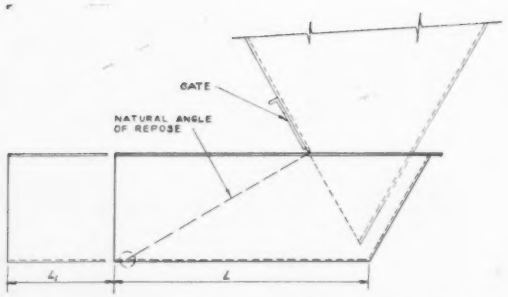

FIG. 1: Features of bin and feeder installation which would apply to majority of bulk-handling installations.

Feeding by

By W. F. Momary, Product Manager—Vibrating Equipment, Robins Conveyor Div., Hewitt-Robins Inc.

Conclusion of a two-part study of vibratory equipment, this discusses design, construction and applications for feeders. Vibrating conveyors were considered in "Handling By Vibration" in the November, 1955 issue.

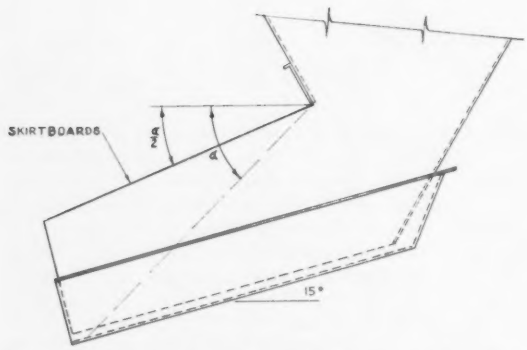

FIG. 3: Depth of material can be increased by skirtboards inside but independent of sides of feeder pan.

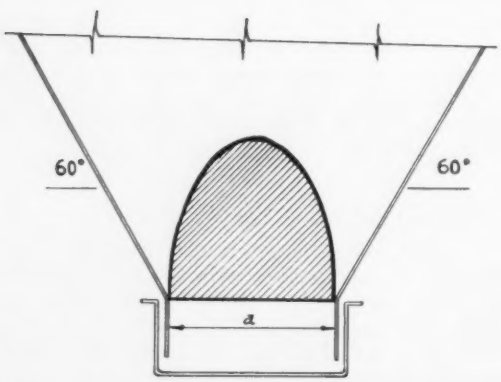

FIG. 4: Actual weight "W" of material in hopper that must be supported on feeder pan is calculated from:

$$W = \frac{2(a^2 l w)}{3}$$

"a" represents width hopper opening in ft.; "l", length hopper opening in ft.; and "w", weight of the material being handled in pounds per cubic foot.

WITH the tremendous increase in the need for mechanization of industries, many serious and difficult problems have developed. Most often they have one, common basis—the attainment and maintenance of a proper flow.

Fundamentally, the ability to mechanize any operation is contingent upon the condition—*if the flow of material can be controlled*—and the success of any mechanized system can be measured in direct proportion to—*how well the flow of material is controlled.*

Flow Control is, therefore, the principal factor in the design and operation of any plant. Flow Control, for bulk material and many small parts, can be accomplished by means of a vibrating feeder mechanism. To meet the demands of many industries, dozens of types of vibrative feeders have been developed—many for one, specific need, others for more diversified uses. The most widely employed has been the vibrating troughed-pan, but there have been a number of important variations, such as tubular vibrating feeders. Thousands of vibrative feeders have been used successfully on all types of material—whether cold or hot (1500 deg. F.) . . . wet or dry . . . 100 mesh to 36-inch cubes . . . corrosive or abrasive . . . packaged or bulk . . . in quantities from a few pounds to 2000 tons per hour.

In spite of this progress, there are still many industries or operations where mechanization is a relatively new development. Many of the engineering and plant personnel involved in these situations have very little, if any, knowledge of vibrative equipment. The result often is either partial or complete failure of an otherwise perfectly mechanized system.

VIBRATION

There is no doubt that a great majority of feeder applications could have been readily solved with the availability of certain basic information. But the degree to which this data has been circulated has been very limited.

No article or tabulation of data could ever be all-encompassing, but the facts and figures presented herein can unquestionably be applied in most feeder applications to some degree, if not completely.

Characteristics of Materials Under Vibration

Probably the most important variable in vibrating feeder application is the scope of materials that can best be handled. It would be impossible to determine any fixed standard to follow for all the materials encountered. However, there are certain aspects of the nature of most materials which can readily suggest the practicability of the use of this equipment.

There are, generally, two physical characteristics of materials that will affect the application of a vibrating feeder—particle size and moisture content. Each of these brackets can be broken down into three subdivisions, as described below, to more clearly establish their commercial application.

Particle Size:

All lump—blast furnace or cupola coke, limestone and ore, nut coal, asphalt stone, railroad ballast, etc.

Lumps and Fines—ROM (run-of-mine) coal and ores, bank run gravel, crushed stone, clinkers, etc.

All Fines—silica sand, borax, screened sinter, clinker, etc.

Moisture:

The three brackets in this condition can best be stated as Bone Dry, Moist and Saturated. The physical and flow characteristics of most materials will vary, to some degree, with a variation in moisture content.

With all lump material there is practically no change in flowability. In the lumps and fines situation there is a slight change, depending on the percentage of fines present—however, in most cases, if there is a sufficient percentage of lumps to act as breakers or

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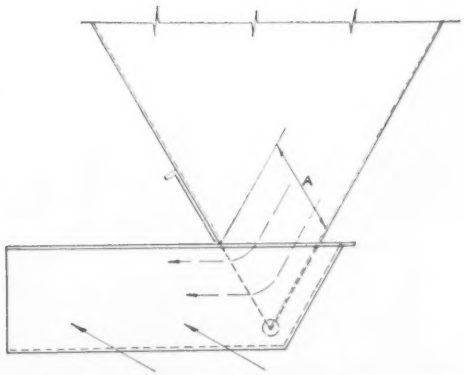
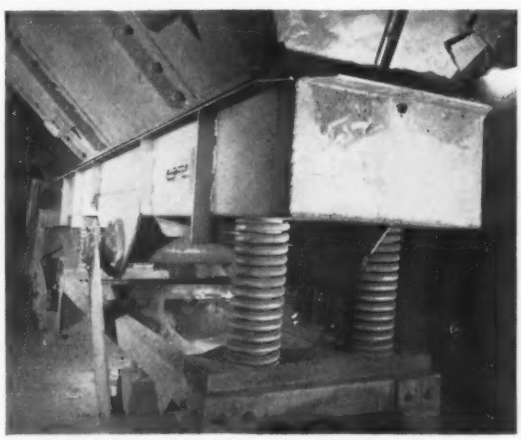
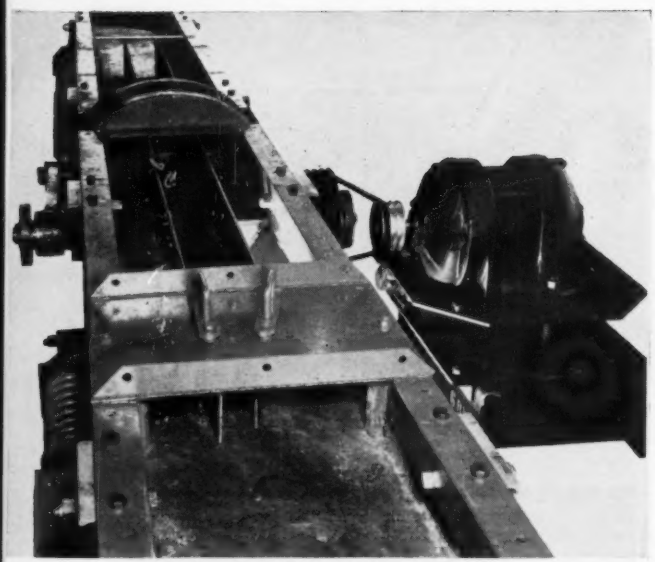


FIG. 2: Proper length of pan intersects, or goes slightly beyond, natural angle of repose of material.

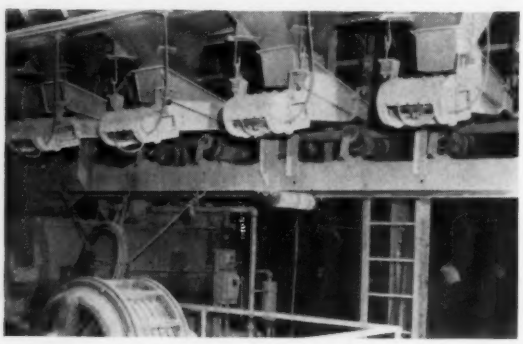
SKIRTBOARDS prevent spill of three-foot bed of material entering 4x8-foot, 3/16-inch stroke feeder.



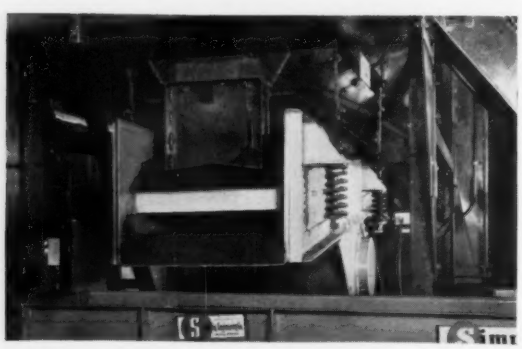
LIMITED HEADROOM permits vibrative feeding if material is free-flowing, supports are adequate, and stroke is large enough to prevent "bogging-down".



ADJUSTABLE GATES allow feeder to accept material from one source and distribute it, at variable capacities, to any combination of three screens.



REFRACTORY uses four vibratory feeders to supply clay aggregates to belt conveyor feeding to pug mill. Rate of feed is from four to twelve tons per hour.



SUSPENDED by spring and cable, feeding to vibrating conveyor, double-deck design draws material through horizontal slot and down in hopper uniformly.

FEEDING BY VIBRATION

Continued

scrapers the mass maintains its flowability fairly well. With fine material, the moisture content is generally the determining factor. Most materials such as coarse sand and fine coal, if rid of all free moisture, can generally be handled safely. In the case of extremely fine, powdery materials such as talc, cement, clay or flour, it is not deemed advisable to utilize vibrating feeders for several reasons. When bone dry, such materials assumes an almost liquid or flooding state under vibration. In a moist condition, they generally become extremely sticky and, when saturated, will actually stay in suspension and be carried off uncontrollably with the liquid agent.

For that reason, the following data will be based on the application of feeders to materials having a particle size equivalent to concrete sand or larger. There are many materials of finer size that could probably be handled on vibrating feeders, but these are isolated cases and usually cannot be based on any of the following facts.

Application of Feeders

Basic points fundamental to any feeder application are:

1. **Proper bin design**—The correct construction of the discharge opening of any receptacle, whether hopper, bin or chute, from which the feeder must draw its supply of material.
2. **Selection of the proper feeder pan**—The correct width and length of troughed pan and its setting, based on the particular service it must perform.

It may surprise many individuals that the design of a hopper can be valued as equal to, or more important than, the selection of the feeder unit itself. To a large degree, the relationship can be considered in the same light as an auto distributor to a spark plug. In fact, improper bin design has probably been responsible for the failure of more new feeder installations—and, consequently, mechanized operations—than any other single factor.

Design: The first and most important requirement in a feeder installation is to insure a constant, controllable flow of material. This can generally be accomplished with very little difficulty if certain fundamentals are followed. In an effort to convey these thoughts and date properly, we refer to Fig. 1. Here is illustrated, as clearly as possible, most of the features of a proper bin and feeder installation which would apply to a large majority of the installations for handling bulk materials.

Probably the most important point of bin design is the proper slope of side plate to insure the constant sliding of material. This is definitely governed by the natural angle of repose of the material and can easily be determined by simple test. Without question, another very important item is the size of bin opening (Dimension "A"). This feature depends entirely on the type of material being handled.

There are two principal points, however, which, when established, can form a basis on which the proper bin opening can be designed. One is the maximum lump size of material to be handled. An acceptable and well founded rule of thumb in this condition is to maintain a minimum hopper opening of at least 2½ to 3 times the diameter of the largest piece. This will prevent the possibility of a bridging action brought on by the wedging or jamming of several of these lumps at the orifice.

The second point is in a problem handling all relatively fine, equally-sized material, such as sand, gravel, etc. Naturally, it would be impossible to utilize the rule stated above as the flowability of this product presents completely different characteristics. The hopper opening in this case must be designed to prevent any self-supporting, arching effect of the material at the bin opening. This arching, or doming, will vary considerably with all materials and the local conditions to which it is subjected—such as moisture, grain structure, etc. But through the proper use of information available on the Behavior of Bulk (*Flow Magazine—Oct.-Nov.* 1954), and actual tests on the material to be handled, the proper solution as to hopper design can safely be achieved.

Still another, extremely critical feature of proper bin design is in the measures taken to prevent excessive compaction of the material which could be caused by the penetration of vibration from the feeder into the mass of material in the bin proper. The most simple and satisfactory manner in which this can be accomplished is to have the discharge opening in one of the side slope plates of the hopper itself, facing in the direction of the line of flow. In this way, very little, if any, vibration is directed up into the mass contained in the hopper (See Fig. 1). The continuous flow of material out of the orifice generates a sufficient amount of resistance to counteract the little vibration that might be transmitted through the mass, at a reversing angle, into the bin.

Feeder Selection: To simplify this discussion, let us first eliminate the variable as to detailed pan construction for any specific problem—such as corrosive or abrasive material—and concentrate on the features concerning only the size of troughed pan, capacity, and its installation.

Naturally, the most important feature of any feeder is capacity. The width of the pan is the controlling factor. There is, of course, a fairly wide range of feed adjustment downward in any specific unit, controllable by factors such as sloping of the troughed pan, speed adjustment, etc.; however, there is a definite formula for the maximum feed rates of any specific width.

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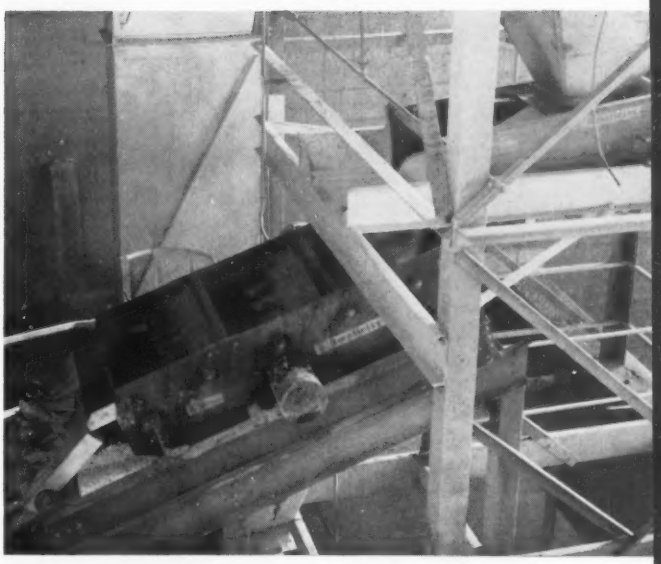
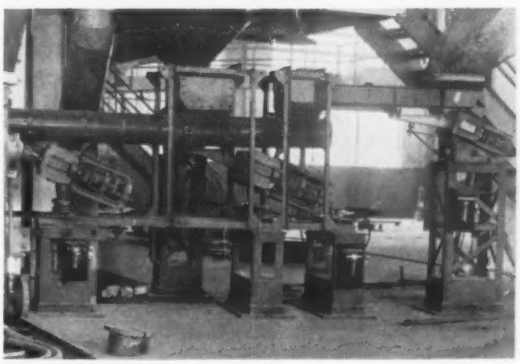
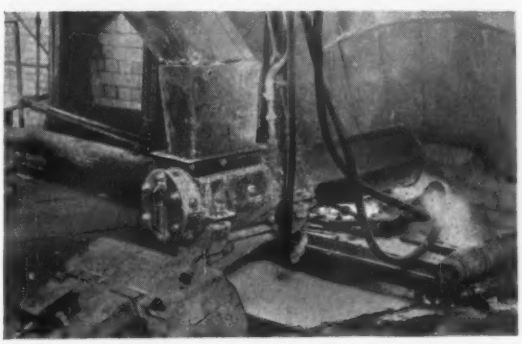


FOUNDRY SAND feeds from bin and over a screen with lumpbreakers on deck. Screen removes paper, lumps too hard for breakers, and other scrap.



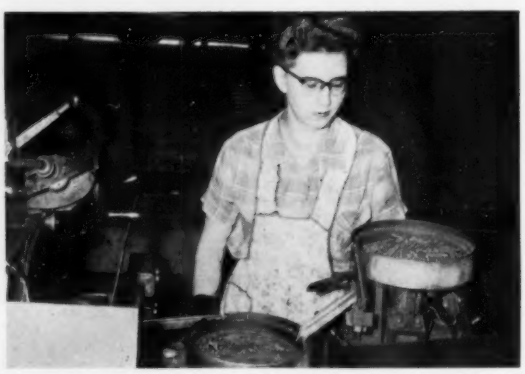
MULTI-POWER electromagnetic, tubular feeder supplies glass batch from hopper to furnace. Electrical control governs flow rate to furnace requirements.



WATER-JACKETED tubular feeder regulates flow of batch to a glass tank. To suit operating conditions, feeders may be constructed of various metals or alloys.

COMBINING functions of stationary grizzly and conveyor, grizzly-feeder unit separates or scalps material discharging into gyratory crusher from dump truck.

IN CANDY-COATING at Loft Candy Corp., nuts are laid down on belt conveyor by electric feeder (lower right). Bars are chocolate-coated by machine (center), then conveyed onto main belt and under feeder (background) which automatically feeds steady stream of chopped nuts for top coating of the confection.



TINY PARTS segregated and fed by vibrating feeder at GE's Carboloy Dept. Unacceptable rod magnets drop in tray, right. Others are sidetracked to 2nd hopper, aligned and then fed to grinding machine.

FEEDING BY VIBRATION

Continued

Width in Inches	**Max. Capacity (Cu. Ft. per Hour)*
24	4,000
36	15,000
48	30,000
60	45,000

**Based on materials weighing 100 pounds per cubic foot and pans installed at 20 degrees downhill.*

While these figures serve as a guide in specifying the capacity of any width, they reflect the capabilities of ideal installations. Several factors which may be present in an existing plant would result in a deviation from these figures, and, for that reason, any proposed installation should be studied fully.

Probably the one fundamental of proper feeder design that is violated most frequency is the use of too long a feeder pan. A feeder unit, by definition, is a device required only to cut off or control the flow from a storage receptacle. The feeder pan should therefore be of the minimum length to accomplish this.

The proper length of a feeder pan (Dimension L, Fig. 2) can best be established in layout by extending it out—at whatever pan slope it may be necessary to install it—until it intersects, or goes slightly beyond, the line of natural angle of repose the material assumes as it flows out of the bin opening without vibration. Generally, the next longer standard troughed pan available is satisfactory as they are available in a wide range of lengths. This will eliminate any chance of flow without vibration. True, the natural angle of repose of many materials will vary with an alteration to its physical composition—such as moisture, grain size and shape, etc. The hopper opening should, therefore, be equipped with a gate mechanism to compensate for this condition and retain the proper relationship of the natural angle of repose to length of pan.

Any extension of the feeder pan beyond this point (Dimension L_1) actually results in the introduction of conveying as well as feeding, and since vibrating conveyors ad feeders are usually selected on an almost entirely different basis of computation, the results could prove disastrous.

In applications of relatively limited volumes, a feeder and conveyor combination unit can and has been used successfully (See "Handling by Vibration", Flow, Nov. '55), but if fairly large volumes of materials must be handled, it is practically necessary to avoid this condition.

In many feeder intsallations handling relatively large size or tonnages of material, another problem, that of pan depth, enters the picture. Quite often, it has been necessary, when feeding this material, to install a feeder under a head of flowing material as much as three or four feet deep. In most cases, it is safest to consider the maximum depth of flow at the

(Continued on page 131)

Where to Use an Air Hoist

By Adolph Ringer
Chief Engineer Pneumatic & Electric Tool Div.,
Ingersoll-Rand Company

SAFE and precise control of heavy fuel hoses at unloading dock is provided by 12 air hoists and two air motors, all operated by one man.

VARIABLE SPEED and exact control are features of this air hoist which swiftly drops (175 fpm) automobile body to floor below where it is fitted to chassis.

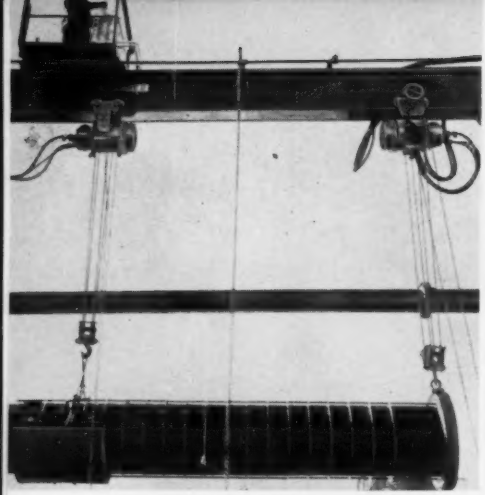
SAFETY of personnel and preservation of property have long been major concerns of modern industry. Last year, for instance, a total loss of $202,360,000 was suffered from 313 industrial and commercial fires. Since reduction of this tremendous waste can be partially accomplished through elimination of all possible hazards in material handling, this article will deal with safety factors surrounding the use of just one common but important piece of material handling equipment—the power hoist.

Specifically, we will point out considerations governing the use of air hoists and air motors in explosive or corrosive atmospheres or in situations where loads must be controlled with precision.

Special problems in the safe and efficient application of power to move a load might be grouped under five general headings:

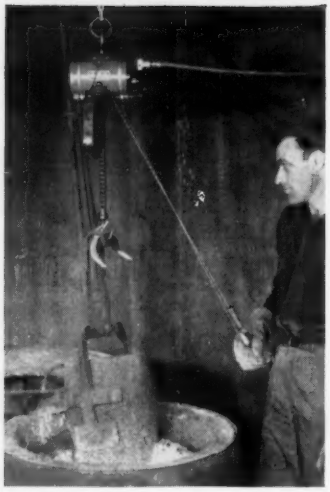
1. Operation in explosive or combustible atmospheres.
2. Operation in corrosive atmospheres or locations exposed to heat or weather.

(More on next page)



TUBE BUNDLES are removed from heat exchangers by pair of 60-ft. high air hoists in a refinery.

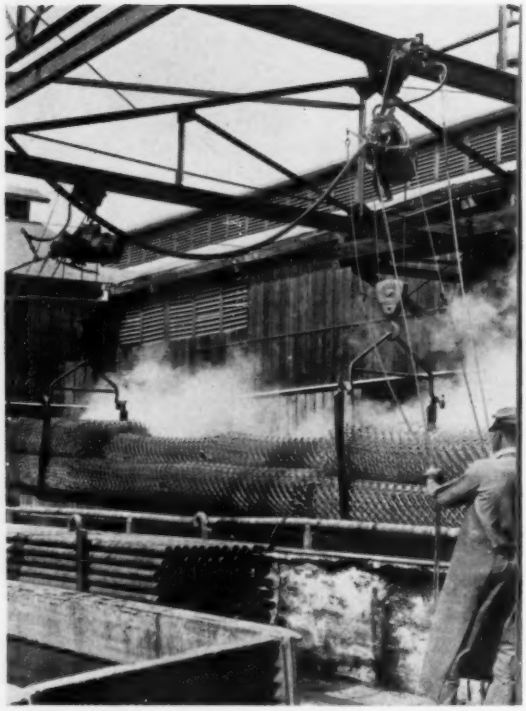
TROLLEYS support air hose permitting lateral movement of plating baskets at almost any speed.



CRUCIBLE of molten metal is lifted by this 1/2-ton hoist. Enclosure protects chain from heat.

WHERE TO USE AN AIR HOIST

Continued



CORROSIVE atmosphere and weathering present no problem to these air hoists which raise and lower woven wire fencing in pickling baths prior to galvanizing.

3. Situations where control of speed or direction in moving a load is particularly difficult or important.
4. Operation where overload or stalling is a problem.
5. Operation in locations difficult or hazardous to personnel.

In each of these situations, consideration should be given to the design features and operating characteristics of air motors and air motor-driven hoists.

It is significant that air hoists are widely used in atomic plants, jet fuel plants, and in the manufacture of explosives. The obvious reason is the complete elimination of danger of electric sparks. Power to the hoists is supplied by compressed air delivered through a pipe or hose from a compressor safely isolated from the hazardous area. Mechanical throttles regulate the flow of air to the motor and thus control the hoist.

It should be noted that what might be called the "explosion-proof" air hoist is just the standard production model, since the explosion-proof features are inherent in this type of equipment.

The problem of mechanical sparking is identical for all hoists, whether air or electric and is relatively easy to solve. If required, non-sparking bronze can be used for hooks and trolley wheels. Cables can be covered with nylon. Control chains and block can be dip-coated with plastic or rubber. In practice, we find that the standard air hoist is acceptable in more than 95 percent of the cases.

In both explosive and corrosive atmospheres, there is advantage in the fact that surrounding air and contaminants cannot get into the air motor. Instead of pulling air in for cooling and ventilation, the air motor has a higher internal pressure which makes it impossible for surrounding air to enter. This not only lessens danger of fire and explosion but prevents wear and damage to the motor. In addition, low pressure exhaust air assists room ventilation and cooling. The same inherent design features enable the air motor to function effectively in abnormally hot locations and, without special protection, out of doors.

Conditions such as described may be found in chemical plants; oil refineries; steel mills and foundries; plants that employ heat treating, plating baths, chemical baths or steam baths; dye works for cloth; and paper mills.

Control for Process and Safety

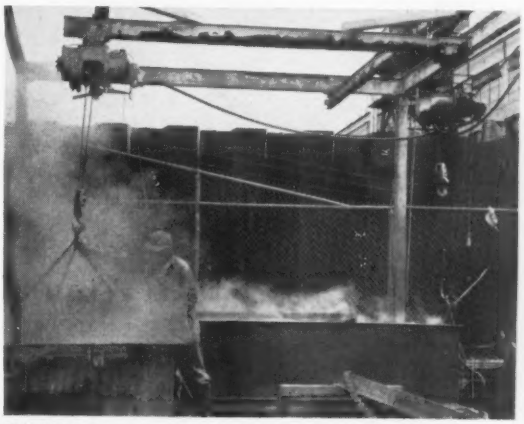
Control of the load is a basic consideration, of course, in all hoist operations and deserves special attention in any discussion of safety. In some situations, precise control of speed and direction is a matter of paramount importance. One extreme example is the use of hoists in the building of 290-foot coastal tankers in a busy shipyard during World War II. Deck houses were built separately, then lifted by four 12-ton air hoists and lowered onto the hull right over the engine room. Precision was essential both to the success of the job and safety of personnel.

Since air motor speed is controlled by throttling the flow of compressed air, the range of speed is unlimited. With some air hoists, the load may be moved at hundreds of feet per minute or shifted a fraction of an inch. A spectacular and demanding application is the body drop in automobile assembly plants. Bodies are lifted as they come or off the line on an upper floor and dropped through a hole to meet the chassis on the assembly line a floor below. To meet the inexorable demands of the moving assembly line, it is sometimes necessary to drop the body at 175 feet per minute, then slow it to a crawl to thread the steering post through its hole and finally rest the body on the chassis in position for bolting. Air hoists are widely used for this operation.

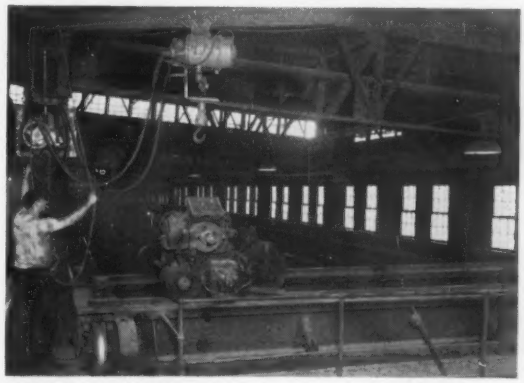
Other important safety considerations include the reaction of hoists to overloads, stalling, interruption of power supply, or failure of brakes. Conservatively rated, air hoists can easily carry a 10 percent overload. When the load is beyond the capacity of the hoist, the air motor simply stalls and refuses to lift the load. The hoist and its air motor suffer no damage of any kind. A mechanical brake is normal equipment on an air hoist, but is not essential to safety of operation. All loads are lowered under power. If the air supply should fail, the automatic brake would hold the load. If the brake should fail, the air motor would in effect become an air compressor and air pressure within the motor would lower the load gently. Again the protection is afforded not by special safety devices but by the inherent characteristics of the air motor.

(Continued on page 92)

DRUMS of highly flammable lacquer are handled safely by non-sparking air hoists at this leather tannery.

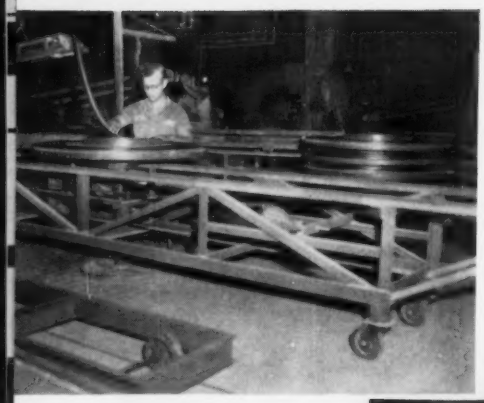


FUMES from caustic tank cannot enter hoist's air motor due to internal air pressure. This feature is said to keep maintenance of the units to a minimum.

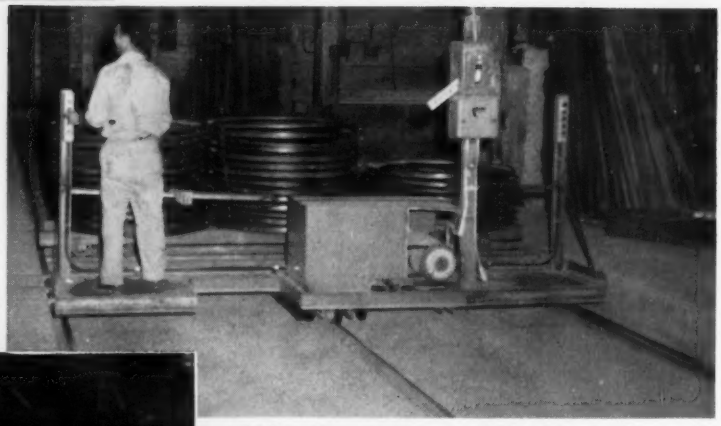


BRIDGE CRANE traction motors are easily lowered to the floor for maintenance by this air hoist, eliminating slow, dangerous repair work high in the air.

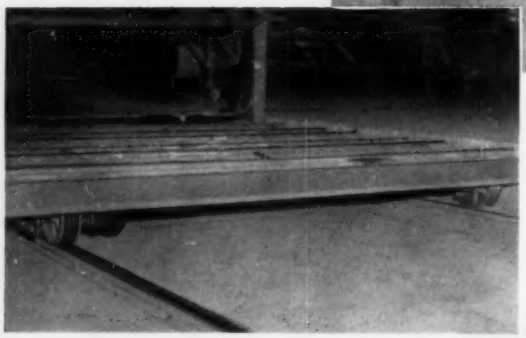
Wheeled Handling Cuts



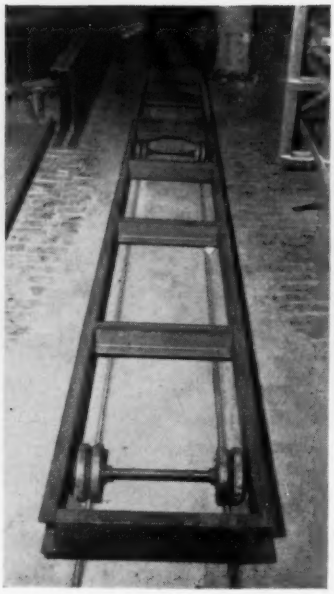
ABOVE: Accumulating on castered carriers are circular tray-loads of extrusions which will be transferred to car (bottom right) having V-groove wheels.



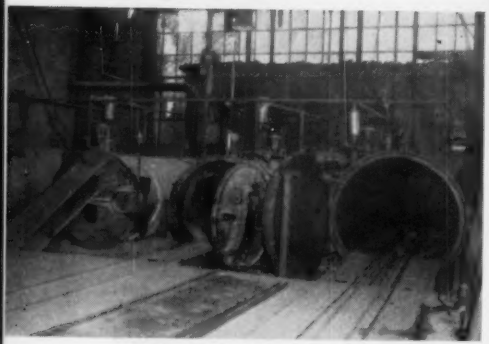
ABOVE: Transfer car, loaded with circular trays, en route to connecting tracks serving curing ovens.



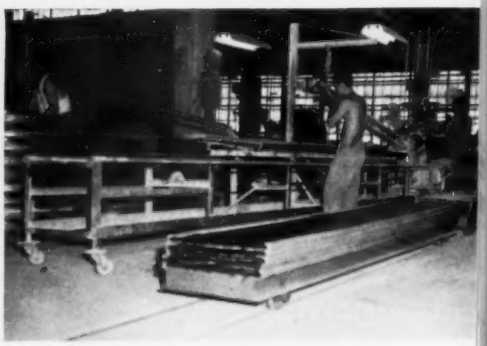
ABOVE: View in pit shows 8-in. V-groove wheels of transfer car.



LEFT: Cars with 6-in. V-groove wheels ride rails throughout travel.



ABOVE: "Bridges" of tracks are raised by hoist to clear oven doors.



ABOVE: Shuttle conveyor lays long strips of extrusions on trays.

Production Time 1/3

COMBINING manual and electrical equipment in an unusual handling system has practically eliminated production delays for Stalwart Rubber Co., of Bedford, Ohio. Since the system first went to work—less than a year ago—it has been credited by management with a productivity increase of 66 2/3 percent—while operating hours remained constant.

Stalwart produces rubber extrusions in lengths of 12 to 16 feet. These are cured in ovens, and one of the greatest time losses in the plant used to occur when loads had to be transferred from extrusion cars (long platform trucks) to oven cars.How this trouble has been corrected is the key to the new system.

As lengths of rubber come off extruders, they are fed by shuttle conveyors to aluminum trays. These are stacked on specially designed cars, mounted on V-groove wheels, which ride on angle-iron tracks. When filled, cars are manually pushed onto a powered transfer car operating at 90 degrees to extruders. It travels on tracks, in a pit, for a distance of approximately 100 feet. On the platform of the transfer car are three sets of tracks, matching those of extrusion cars as well as tracks leading into the curing ovens—which are on the side opposite the extruders and, again, at right angles to the transfer car tracks.

The transfer car can transport three carloads of extrusions, taking them from the line of 10 extruders—each with its own set of tracks—to the ovens.

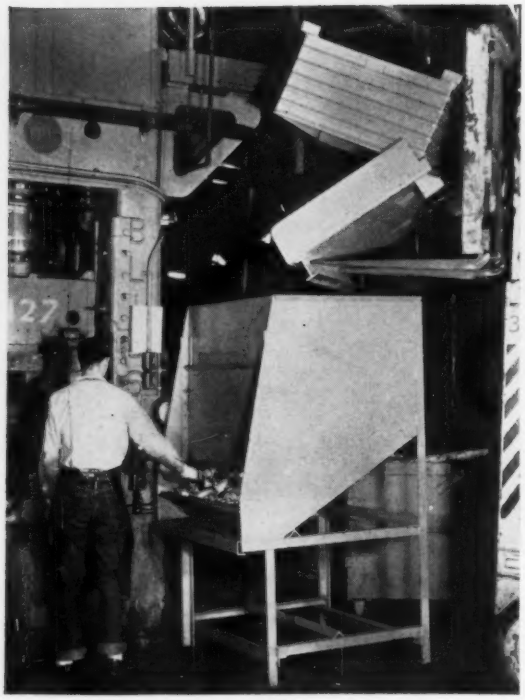
Electrically operated, the transfer car has dual controls and "jog" buttons with which to match tracks quickly and accurately. It is equipped with fluid-drive, Twin-Disc clutch to provide smooth starting and stopping. As a safeguard against possible injury to personnel, power is fed to the car from an overhead cable on a takeup reel. Controls are provided on both sides of the car.

When the tracks of transfer car have been aligned with those of an oven, the entire car of extrusion is manually moved in.

As oven doors operate horizontally, tracks must be cleared to allow for the door swing. A "draw bridge" section of track in front of each oven is lifted by

(Continued on page 98)

PROTECTION against any possible accident provided by take-up reel for electric cable mounted overhead.



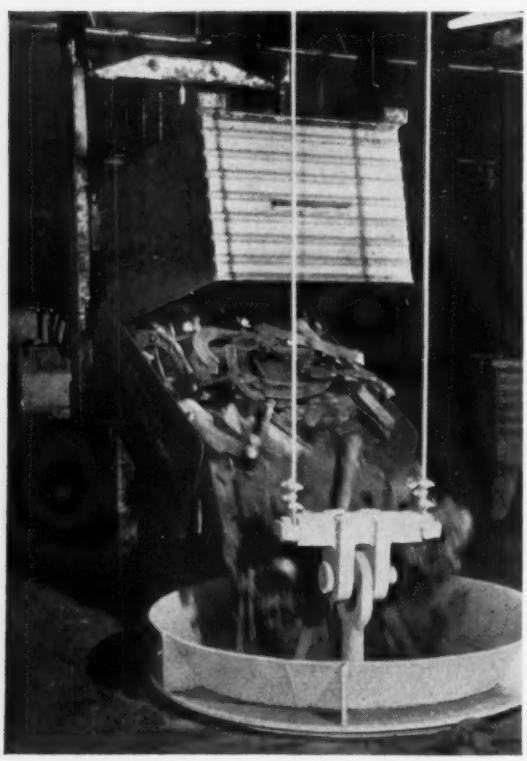
GRAVITY-FED hopper supplies parts at work-height for longer, repetitive press operations, is loaded from drop-bottom containers handled by fork truck.

PORTABLE racks, used to work-position and store anchor base rods for street lighting, are corrugated pallets with stakes and tiering angles for stacking.

Union Metal Mfg. Co.

Anything

A plant's production may involve the need to handle a wide range of everything from cupola charges through small parts to finished, heavy assemblies—but each step can be made faster, easier and more economical through unit loading, as examples show.

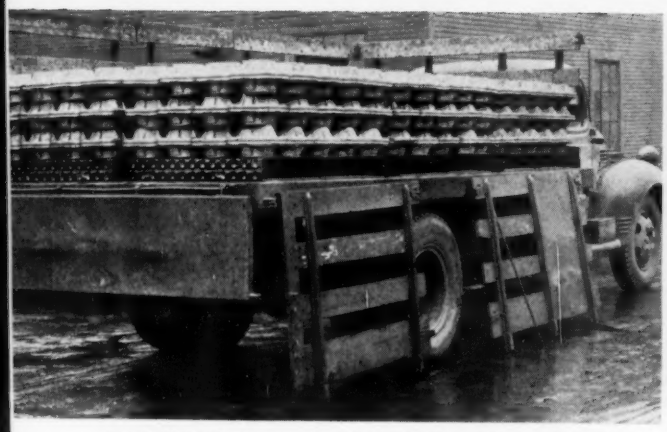


CHARGE of pig iron and scrap, accumulated in drop-bottom box, is dumped by fork truck into recessed charging bucket for automatic hoisting to cupola.

REGARDLESS of the diversity of a company's product lines—and the extremes in types of materials which may be encountered throughout production—the unit load principle of material handling can be successfully employed.

Unitizing is a method of flexible control that reduces direct and indirect labor costs. It helps considerably in the establishment of handling systems that can keep pace with improving production processes.

Many of the ways in which unitized handling can be adopted for varied types of materials—through a wide diversification of production processes—to produce benefits both tangible and intangible are shown at the Union Metal Manufacturing Company, of Canton, Ohio. The company operates numerous, distinctly different divisions, making such products as one-pound castings and 70-foot ship booms weighing 60 tons. Between these extremes fall a variety of container-type material handling equipment; flood lighting poles; foundation piling; hundreds of different sizes, shapes and kinds of street lighting standards and accessories; electric meter, switch and test blocks and boxes; highway trailer-truck undercarriages; and even parking meters. Materials which must be handled include foundry sand and 75-foot lengths of steel sheet.



CORRUGATED steel pallets hold wide variety of heavy items for unit-load handling, tiering. Loaded for shipping are castings for street lighting standards.

STORAGE capacity of warehouse was increased by one third through use of compact, drop-bottom boxes, which contain in-process stampings and other parts.

shows that, in handling metal products, practically . . . . .

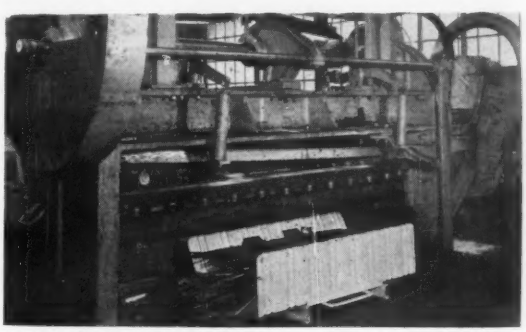
Can Be Unitized

Unit load handling is applied to practically all materials passing through the Union Metal plants. Material is work-positioned, tiered for compact in-process storage, mechanically dumped, and transported in unit loads. Equipment used includes skids, pallets, conventional industrial containers, drop-bottom boxes, open-end trays for lengthy pieces, bolsters, front-end-loading scoops, positioning stands, fork and straddle trucks, hoists, bridge cranes, mobile cranes, mobile yard cranes and industrial trailers.

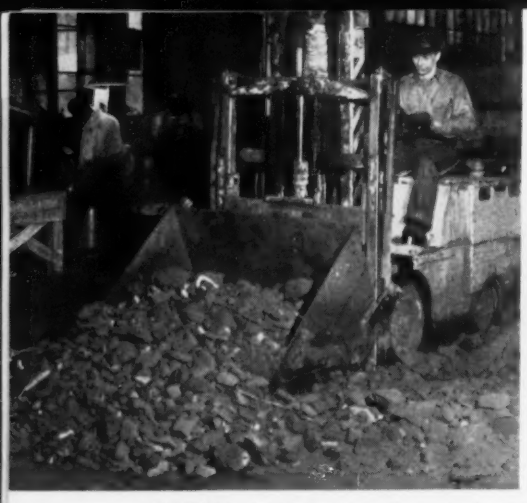
Here are some specific benefits the firm has realized through versatile unit load handling:

1. Production increased at 10 press operations an average of 37.4 percent by positioning a continuous parts supply at work-level height.
2. Warehouse storage capacity increased 33.3 percent in the same floor space through the use of more compactly designed and tierable containers.
3. Scrap loading costs were reduced 87.5 percent with mechanically dumped unit-load containers.
4. In the foundry, unitizing cupola charges and mechanizing charging operations have produced savings in manhours of 62.5 percent.
5. Unit load handling of huge tube stock has been achieved with specially designed bolsters, and much heavy equipment formerly tied up by such work—around the clock—has been released for other jobs, replaced by only two straddle trucks.
6. Manhour savings of 95.8 percent were gained in mechanizing the removal of used core sand and wires from the foundry's cleaning room floor.

SCRAP is segregated in drop-bottom boxes and tiered in accumulation areas until a truck load is collected. Then fork truck loads it out in a matter of minutes.



TRIMMINGS behind shear are collected in steel trays, which fork trucks carry to storage area, compactly tier, then mechanically dump into scrap dealer's truck.



SCOOP attachment on fork truck collects used core sand and wires—saving 95.8 percent in man-hours over hand-shoveling. It also loads cupola charges.

BOLSTERED loads of tubing, stored in yard, make selection easier, much faster. Formerly, large quantities often had to be moved to get required material.

ANYTHING CAN BE UNITIZED

Continued

7. Such previously hard-to-handle materials as long shear trimmings, steel bar stock, blanking skeletons, gas and oxygen cylinders—and a variety of plant supplies—are efficiently moved and stored in unit loads with skids, pallets, pallet racks and other industrial containers.

Work Positioning at Repetitive Operations

Material for all fast, repetitive press and drilling operations is work-positioned. Placing parts at work-level height enables press operators to follow a fast, efficient work-rhythm, and eliminates the lost time and motion involved in bending over and stretching for parts. Providing a continuous supply of parts at work level also ends time lost in waiting for additional material to be delivered to the work station.

Drop-bottom boxes and positioning stands are employed at press operations. A fork lift truck sets the box in the stand. As the forks are lowered, the hinged bottom (a single sheet of steel plate turned up at the sides to form a chute) lowers, and parts flow into the tray of the stand. The tray holds 25 percent of the box contents—more than enough to keep machine operators supplied with material while empty boxes are replaced. Gravity-fed hoppers are used for work positioning on longer machine runs. These units are one-piece versions of the box and stand.

Portable racks are also used for work positioning and storing formed, threaded anchor rods. These are corrugated, twin-deck steel pallets with stakes on two sides. Tiering angles at the four corners allow them to be stacked. Fork slots provide for four-way entry. The two-sided racks are set on stands, or on another rack at the work station, to position material at work-level and thus speed machine servicing.

For feeding long strip to presses, a special, portable, work-height platform is used. It is mounted on casters and can be towed to various locations by a fork truck. At a machine, it is lifted (by the truck) onto wooden supports which provide the right height to serve that particular equipment. When the machine is not operating, the supports are stacked to one side, out of the way, and the platform, if not required at another location, is rolled to any convenient area for temporary storage.

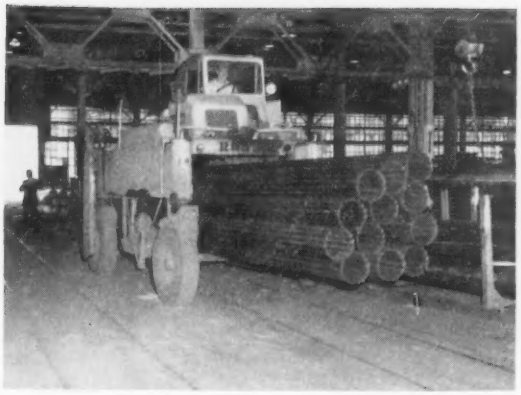
Full Utilization of Storage Space

Since materials are handled in unit loads, and because all containers are tierable, vertical air space is utilized fully to gain maximum efficiency from floor or ground space.

Previously, most materials were handled and stored on skids equipped with stake pockets. Chief disadvantages were the inability to tier them and the maintenance costs resulting from heavy loads and power truck handling.

Now, a wide variety of weldments and castings—ranging from 30-pound lamp standard base castings to fabricated transformer bases—are palletized and stacked. They accommodate more material than did the old skids. For example, 18 transformer bases can be stored on a pallet while skids held only 12.

Skid boxes of in-process stampings and other parts previously were tiered three high in warehouse storage. Most of these have been replaced by drop-bottom boxes. They have the same capacity (approximately 6,000 pounds) but can be tiered four-high in the same warehouse increasing its capacity 33.3 percent. The same containers are used for in-process storage, feeding and receiving parts at work stations, transporting,



LOADED and unloaded by overhead crane in plant, unitized tubing is moved to storage area by straddle truck. System is safer, has cut machine down-time.

TURNING bundle of sheets at rollout by overhead crane with bar and clamps. Handling single sheet formerly required 5 men; now 2 men handle unit load.

and for dumping. This integration cuts costly rehandling.

Long steel bar stock also is handled in unit loads. Bar rack skids—inverted skids with riveted crane lugs at all four corners—are used. These are safely tiered 10-high and are crane lifted onto four-wheel industrial trailers for movement to production areas.

Scrap Handling Almost Fully Mechanical

The handling of scrap has been mechanized by employing fork lift trucks and three types of mechanically dumped containers.

Small scrap, such as slugs, chips, turnings, and even rubbish, are handled with the same drop-bottom boxes used for work positioning, transportation and storage. Loaded with scrap, boxes are fork-lifted from production to scrap accumulation areas, where they are tiered until a truck (highway) load has been collected. The scrap dealer is then called, and the scrap is drop-bottom dumped from the box into his truck. This system has sharply reduced loading time over the old manual method. It also makes it easy to segregate scrap for greater return.

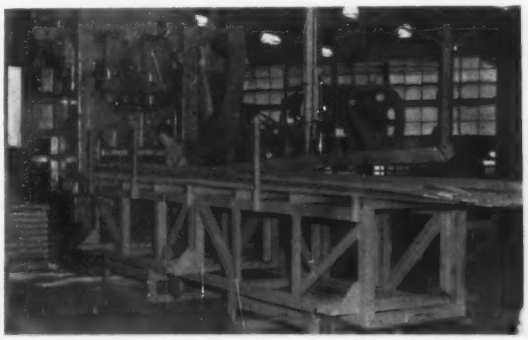
Long pieces of scrap, such as shear trimmings, are handled with corrugated steel, open-end trays. One is placed behind a shear to catch trimmings as they fall. When a tray has thus been automatically loaded, a fork lift truck carries it to the scrap accumulation area and tiers it. Trays are mechanically dumped by a fork truck.

Cupola Charged by Unit Loads

For foundry operations, metal scrap, pig iron and coke charges for the cupola are prepared in unit loads which are weighed in drop bottom boxes by means of a mobile scale carried by a fork truck. These box loads are accumulated and banked against anticipated requirements and then dumped into a charging bucket.

(Continued on page 94)

PALLETIZED gas cylinders (15 per load) make handling, storage easy. Steel pallets have removable top rails. Unit assembled at delivery, handled by fork truck.



FOR FEEDING long strip to press at work-height, platform is set on wooden supports by fork truck. Platform is rolled from machine to machine, as needed.

D. B. Anderson Heads Caster and Floor Truck Group

Highlight of the final 1955 meeting of the Caster and Floor Truck Manufacturers' Association was the election of officers for 1956 and presentation of an award to W. J. Daugherty for outstanding service to the association.

At left, Donald B. Anderson, treasurer of Nagel-Chase Manufacturing Company is shown handed the president's gavel by retiring president Kenneth F. Heath, sales manager of Nutting Truck Caster Co.

Anderson, left, presents Daugherty with an award for his work as chairman of the Industrial Wheels Standards as James S. Hanson, chairman of the Standards Coordinating Committee, looks on. Daugherty is manager of the Development Division, Firestone Industrial Products Co. Hanson is vice president of The Fairbanks Co.

A. B. Anderson, right, who was president of the association from 1949 to 1950, congratulates son.

Farquhar's "Roll-Free" Gravity Conveyors speed production loading at the York Container Company.

Farquhar Car Unloader coupled with Farquhar Power Belt Conveyors move bulk materials from the hopper car directly into this large industrial plant.

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Then there's Farquhar's modern Car Unloader and Power Conveyors that carry sand, coal, gravel and other materials directly from the hopper car to the material stand inside the plant.

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The difference . . . important to every solid tire user . . . is "inside". It's the blending of top quality materials and special production techniques. Some tire compounds, like Monarch's new T-48C, have proven outstanding on all counts. Others . . . well, those are the tires you have to replace frequently. And that can be costly!

Solid tires are Monarch's specialty. That is why Monarch can give you premium quality tires . . . tires with superior resistance to cutting, chipping and splitting . . . at normal prices.

Try them. If economy is your goal . . . Monarch is your tire!

TORTURE TESTS PROVE...

BEFORE . . . Monarch Mono-Cushion and two competitive tires looked alike.

AFTER . . . there was no doubt! Only the Mono-Cushion still was usable.

MONARCH *Mono-Cushions*® Wear Better... Last Longer

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THE MONARCH RUBBER COMPANY

210 LINCOLN PARK • HARTVILLE, OHIO
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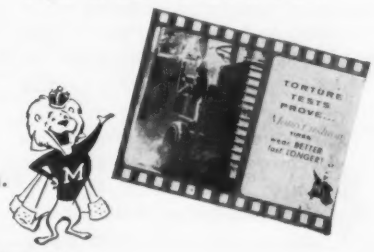
WESTERN STATES REGIONAL OFFICE
1035 Bartlett Street, Hayward, Calif.

Write for BULLETIN TD-200 for the complete story . . . or refer to Yellow Pages for name of nearest dealer.



Circle No. 125 on Reader Service Card for more information

AIR HOIST . . .

(Continued from page 83)

There are many situations in which air motors and air hoists are used in difficult locations to protect personnel. Let me cite two brief examples. In a paper mill where wood chips are cooked under pressure in a sulphuric liquor, an air motor is used to operate the digestor dump valves. The operator controls the motor from a station 50 feet above the valves, safe from steam and acid. In a large industrial plant a long lift air hoist was mounted on a jib boom above a 25 ton electric bridge crane so that the heavy crane traction motors and truck parts can be lowered to the floor for maintenance. This not only has speeded maintenance work but has made it unnecessary for men to try to effect repairs on high, narrow beams.

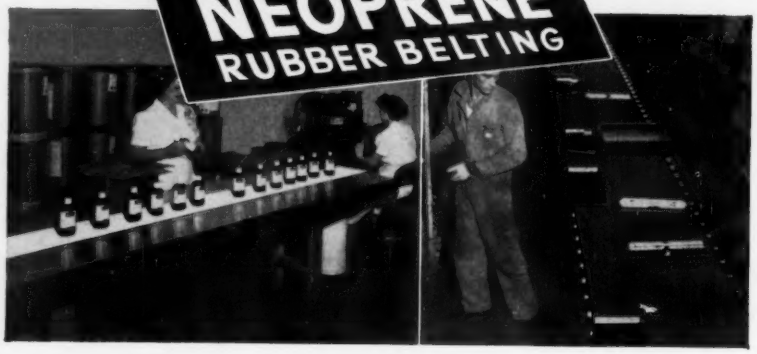
Recently I had occasion to visit a major eastern refinery where use of air hoists epitomizes most of the operating and safety considerations outlined. There are 125 air hoists in the refinery area; 50 of them direct lift hoists and 75 utility (winch-type) hoists. Capacities range from 500 pounds to 6000 pounds. There is a hoist permanently installed at every high structure. For example, there is a boom at the top of the new 200 foot high catalytic cracking unit, used with a utility hoist at ground level to lower literally thousands of components for periodic maintenance. In addition to these permanent hoists, the refinery has a considerable number of utility hoists mounted on low steel trailers which can be hauled by truck to any job.

Safety of operation in combustible atmospheres is an obvious reason for use of air hoists where fire hazards are great. Control and safe handling of heavy loads are other major factors. One important job in a refinery is the pulling of tube bundles, some of which weigh 8½ tons, a task that requires precision to avoid damage to equipment and danger to personnel. The hoists are also widely used in con-

built to combat

OILS OR GREASES
ACIDS OR ALKALIS
FLAVORS OR ODORS
COLD OR HEAT
DUST OR DIRT

GLOBE NEOPRENE RUBBER BELTING



• Improved "thin-ply" belting with square edge, minimum stretch, positive traction, smooth surface and excellent flexibility, is taking the lead for conveying and power transmission. This belting is engineered by Globe for specific needs. Ideal for heavy industry or assembly plants, Globe's Black Neoprene Rubber Belt resists abrasion, oil, greases, acids or spillage that affect ordinary rubber belts. For the food handling industry, Globe's White Neoprene Rubber Belt and Hycar Rubber Belting resists organic and inorganic chemicals that have a marked effect upon natural rubber belts. For the textile, tobacco or other similar industries, Globe's Brown Neoprene Rubber Friction Surface Belt is valuable for many transmission operations. This belt is equally valuable for normal conveying operations where rubber covers are not required.

BLACK OR WHITE CONVEYOR BELTING —
for oily conditions or where combined heat and oil are encountered. High abrasion resistant 3/64" top cover, friction bottom.

WHITE OR BROWN BELTING —
friction surface top and bottom for transmission and conveying purposes.

WHITE OR BROWN RUFF TOP CONVEYOR BELTING —
for incline and decline conveyors.

WHITE HYCAR RUBBER BELTING —
for severe grease conditions, quick freeze temperatures, and above average heat conditions.

CLEATED BELTING —
with rectangular, crescent or U-shaped neoprene cleats vulcanized securely into the belt for conveying on severe inclines.

CUSTOM MADE BELTING —
cut to your exact width and length. All belting can be made endless at our plant or on the job by vulcanizing or cementing and air drying at room temperature.

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KNOWN FOR QUALITY THE WORLD OVER

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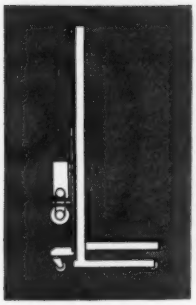
Shown at left is Uplifter loading highway truck.



Revolvator Uplifters:

1000 lb. capacity — platform length 24", platform width 24", lift 62".*

2000 lb. capacity — platform length 30", platform width 30", lift 65".*

REVOLVATOR UPLIFTER PORTABLE ELEVATORS

you benefit by over 50 years of experience

Multiple use, multiple purpose Revolvator Uplifters, products of 50 years of engineering know-how, solve handling problems throughout all industry. Ideal for shop usage, Revolvator Uplifters also speed handling in the shipping department with equal efficiency. The Uplifter is ideal when no shipping dock is available. Electrically-powered Uplifter portable elevators are available in either "plug-in" or battery operated models. Platform and load are lifted by means of a highly efficient motor-driven pump, activating a hydraulic ram and *two* roller chains, guaranteeing safety and ease of operation. Zee bar construction in uprights assures no sway, no binding of the rollers. Today write for full information.

**Also available in dual capacity hand-operated models.*

REVOLVATOR CO.

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struction work, erection and dismantling of tanks, in the boiler and pipe fabricating shops, and a variety of other jobs.

Refinery engineers mentioned two additional features of air hoists which are worthy of note: convenience in providing compressed air, and low maintenance costs. Permanent hoists, of course, receive air by pipe as part of the regular distribution system. In the case of the mobile utility hoists, the operators either string hose from the nearest air line or, in areas where it is permissible, use a portable air compressor to power the hoists.

As for maintenance, they point out that a mechanic or machinist can handle any repair job on an air hoist. At this refinery, with 125 hoists, the annual average parts cost has been $300, or approximately $2.40 per year, per hoist. It has never been necessary to overhaul more than six hoists in a year, which would indicate that the hoists run many years between overhauls, providing an economical, efficient and safe method of material handling.

UNITIZED HANDLING . . .

(*Continued from page* 89)

This is elevated into the top of the cupola by hoist through an electric, remote-control system. The method has produced man-hour savings of 62.5 percent in this phase of preparing and handling charges for the cupola, and has contributed greatly to safety and better working conditions.

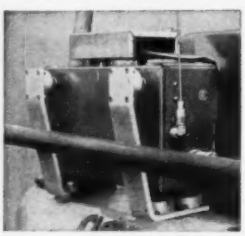
In collecting used core sand and wires from the cleaning room floor of the foundry, two men previously worked about six hours, shoveling the materials into side-dump trailers. Now, a fork truck does the same job in only half an

(Continued on page 96)

Cuts Waste Motion with RCA 2-Way Radio

Dispatcher of trucks and materials handlers assisted by a clerk can coordinate the efforts of truck drivers and labor crew from a centrally located office.

Foreman stops at truck to radio instructions to office—another one of the "extra benefits" reported.



Special "shock mounting" developed by RCA for this installation to cushion equipment against rough roads.

Less Than One Year's Pay-Off for Carfone Equipment Predicted at Rohm & Haas

Service peaks on Mondays and Fridays at the 46-acre plant of Rohm & Haas at Bristol, Pa. used to tax materials handling equipment beyond capacity. Empty runs wasted men and trucks, cut down on efficiency. Instant RCA 2-Way Radio communication with five fork lift and three stake trucks, commencing in March, this year, licked the problem. In addition, since using radio they have eliminated much "paper work" and now are using only one form instead of four.

Based on an estimated annual savings, the materials control area supervisor predicts that the equipment will pay for itself in less than a year.

RCA 2-Way Radio permits drivers to get started on new assignments at a moment's notice. Dispatcher can "pick-up drivers" at any location to efficiently eliminate wasted time and trucks. Even in high noise level areas, the two-way flow of information is fast, continuous and positive, thanks to directional re-entrant horns.

RCA *Carfone* equipment can do a similar job for you in handling materials efficiently in your plant . . . indoors or out. Precision manufacturing and built-in quality for which RCA is famous, are your guarantee of top performance in the toughest kind of operation. Mobile units fit almost any handy location, require a minimum of maintenance, permit quick servicing when needed. The RCA Service Company provides nation-wide service facilities if desired. Why not get complete information now?

RADIO CORPORATION of AMERICA

COMMUNICATIONS EQUIPMENT **CAMDEN, N. J.**

Radio Corporation of America
Dept. A-131, Building 15-1, Camden, N. J.
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☐ Please send information on RCA 2-Way Radio
☐ Have an RCA representative get in touch with me

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COMPANY_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

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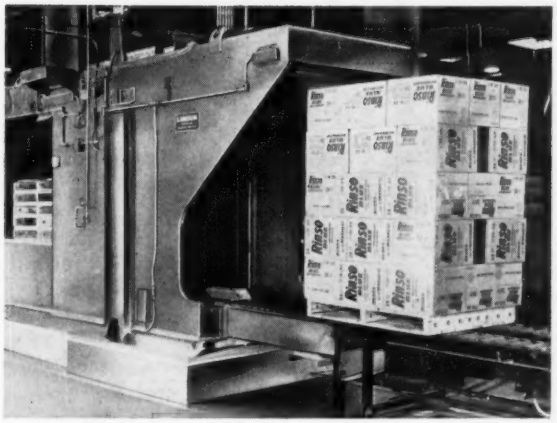
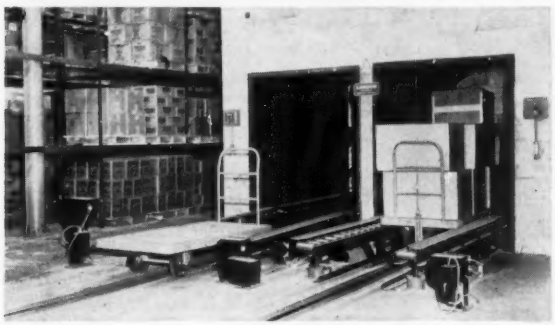
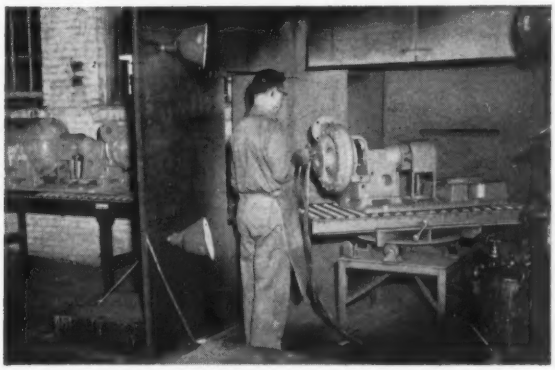
LAMSON conveying systems put MUSCLE in movement



AUTOMATIC PALLETIZING . . . A series of six Lamson accumulator lines branching from the main conveyor feed this Lamson automatic pallet loader. The palletizer stacks individual cartons in a predetermined pattern onto a pallet . . . can automatically perform almost any interlocking stacking pattern. Handles up to 40 cartons a minute.



TRANSPORTATION BETWEEN FLOORS . . . Automatic truck service between two floors of this warehouse is accomplished by two special vertical reciprocating conveyors – one up and one down. Carts and palletized loads automatically run into the lift on the right by means of a Lamson 20′ drag line, and are sent to the second floor. The other lift returns the trucks to the receiving area.



ASSEMBLY AND PAINTING . . . Pumps move on a Lamson roller gravity conveyor through assembly to the painting department where a roller turn-table allows the operator to carefully spray each pump. A Lamson belt conveyor then carries the pumps to the second floor warehouse for packaging and storage.

ORDER PICKING SYSTEMS . . . Incoming orders from the checking table are put into cartons and then sent along the packing line roller gravity conveyor. Empty tote boxes are shown returning to the head of the order picking line on a Lamson overhead chain conveyor.

The four applications pictured above are typical of how Lamson integrated conveying systems expedite materials handling in all types of manufacturing and warehousing.

How is Lamson *unique* in putting muscle in movement?

Lamson has had over 75 years' experience in the design and manufacture of conveying systems for both *large* and *small* installations.

Whatever the *product* or *project*, the objective of our engineering staff is *always:* to design a system which will cut your handling costs, eliminate bottlenecks, and increase productive output.

Lamson has the widest line in the industry of all types of heavy- and light-duty belt, gravity and live roll conveyors; overhead chain, and heavy-duty reciprocating vertical conveyors; continuous combing vertical conveyors and special conveyors and automatic pallet loaders.

This is why Lamson is your *one* best source of engineered conveyor systems.

FOR FREE INFORMATION, CLIP TO YOUR LETTERHEAD ▶

Send me these bulletins:

( ) "Conveyor Facts"

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Plants in Syracuse and San Francisco
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RACK PALLET TRUCKS *answer* every Pallet handling need!

Rack lightweight—heavy duty hydraulic Turnabout trucks—mass produced for low initial and maintenance costs—are of all welded steel construction, featuring overload safety valve, chrome plated rams and pistons, interchangeable forks in standard lengths of 30", 36", 40", 42" and 48"—and special lengths of 54", 60" and 72".

Write for Bulletins today!

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131 SIXTH STREET CONNELLSVILLE, PA.
Distributors in Principal Cities
Plants: Connellsville, Pa.; Gardena, Calif.; Farnham, Canada; Slough, England
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Continued

hour. A scoop is attached to a fork lift truck in less than a minute (without fork removal), converting it into a front-end loader.

As in the stamping department, castings in the cleaning and grinding room are work positioned.

Tube Stock Handled by Bolster Load

Tubes for ship masts, lighting standards and monotube foundation piling are now handled in bolstered unit loads by straddle trucks. The trucks pick up a bolster load in the tube plant and carry it to an outdoor storage area, for horizontal storage.

Previously, tubes were lifted by the crane (and sling) in the tube plant onto trailers. This was a time-consuming operation, involving picking up individual tubes at the balance point. Men, crawling over the tubing to help with loading and unloading, were subjected to considerable danger, outdoors in the winter, with tubing covered with snow and ice.

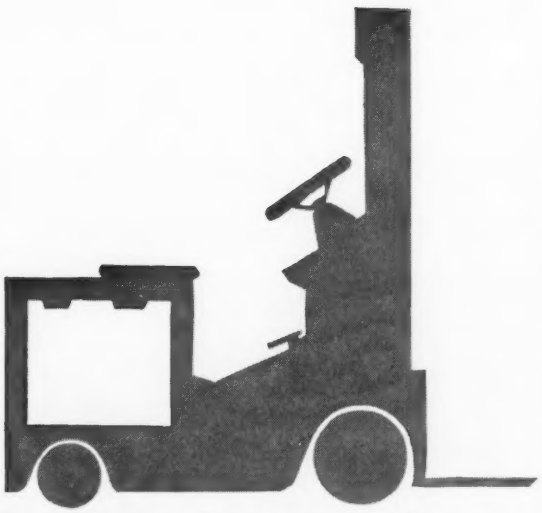
This unsatisfactory handling method caused costly production delays. When the tube plant needed a few tubes of a special design, large quantities of other tubing had to be moved to reach the special types desired. Tubing on the plant floor caused further delays, interfering with servicing.

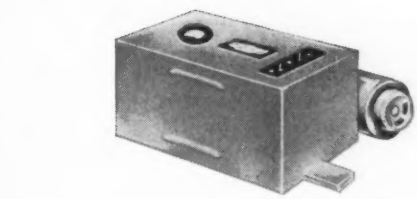
Now, all tubing is handled in unit loads in bolsters. These are loaded and unloaded by overhead crane, in the plant, and moved to storage areas by straddle truck. When an order comes through to modify tubing, the bolster load containing the proper size tubing is quickly carried by a straddle truck from in-process storage to production—where the needed tubes are removed by bridge crane at the use point. This unit load handling method has proved far safer than the old way. It permits the company to sharply reduce machine downtime and supply customers with greater speed.

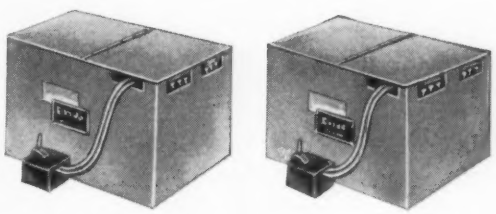
Union Metal engineers devised an ingenious fork truck attachment for loading tubes. It con-

(Continued on page 98)

NOW! Initial cost of electric industrial trucks cut drastically by unique new Exide® Plan







Buy only the truck chassis! | **Lease batteries and charger!**

Get superior electric truck operation!

Exide's new plan enables you to enjoy the efficiency and economy of electric fork and lift trucks, with relatively low cash outlay.

To reduce the initial cost of a complete electric-truck work package (truck chassis, batteries, charger), and to prove that you can operate Exide-powered electric trucks at substantially lower costs than trucks powered by other means, Exide offers this unique, money-saving plan:

1. You *buy* only the electric truck chassis.
2. You *lease* the Exide-Ironclad batteries and charger. (Terms are flexible to meet your needs and surprisingly low!)

Result: Your initial capital outlay can be cut as much as 33⅓%, whether you purchase one electric truck or a fleet! You pay for superior Exide power *as you use it.*

With one electric truck, for example, you can save as much as $1425 per year. These savings are made possible by longer working life of the truck, lower power costs, lower repair and maintenance costs.

Make us prove these savings in your plant! Call your Exide sales engineer. Ask your electric-truck salesman. Send the coupon for all the facts!

Exide Industrial Division
The Electric Storage Battery Co.
Philadelphia 2, Pa.
Send me complete details about the new Exide Plan for cutting initial cash outlay on electric industrial trucks.

Name_____
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City_____ Zone____ State____

Exide INDUSTRIAL DIVISION, The Electric Storage Battery Company, Philadelphia 2, Pa.

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UNITIZED HANDLING

(*Continued from page* 96)

sists of a mast-type extension attached perpendicularily to the truck forks. At the end of this mast is a cable-controlled "ice tong" device which grasps the tube. The fork truck is equipped with an auxiliary hydraulic lifting mast. With independent action this manipulates the grab. The handling method requires only the fork truck operator, enables the company to load long heavy tubing into van-type trailers, and permits loading to be accomplished any place, instead of only under a crane.

The company's basic philosophy is that material handling is strictly a service facility, a necessary and important means of attaining efficient production. In the evolution of its present methods, Union Metal has found greatest efficiency resulted by standardizing on containers which can handle a given kind of material through all the processing, transfer and storage phases required.

Pictures and data through the courtesy of the Industrial Metal Container Product Section of The Material Handling Institute, Inc.

WHEELED HANDLING . . .

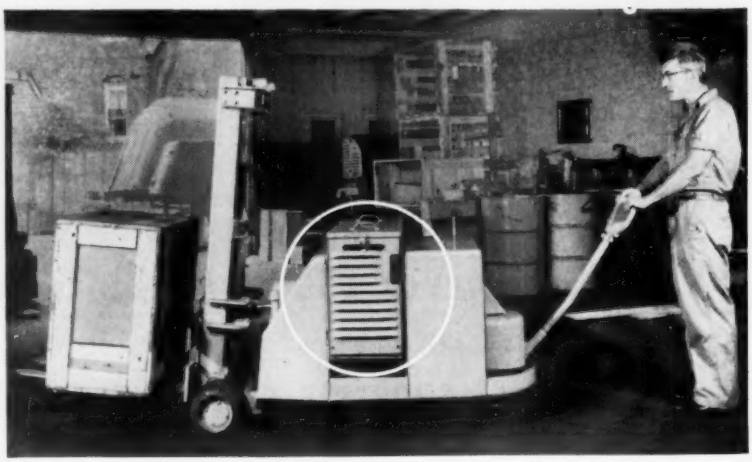
(*Continued from page* 85)

electric hoist to clear the path. Tracks remain suspended as long as the oven is in operation.

The system was laid out by W. M. Kelly, of Nook & O'Neill, Inc. Wheels were provided by Faultless Caster Corp.; the cable reel by Appleton Electric Co.; and the power transmission by Daykin Engineering Company. Equipment was designed by Edward C. Schmidt, of Pucel Enterprises. Fabrication of equipment also by Pucel.

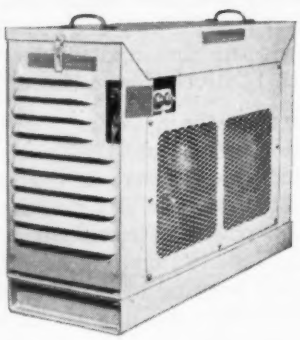
The Most Versatile Power Unit Ever Developed For Small Trucks

READY-POWER BANTAM MODEL W



Only the compact new Bantam Model W provides smooth, dependable gas-electric power that can be quickly interchanged from truck to truck.

A new high-performance unit features 12-volt automotive-type starting and ignition system plus complete choice of idling speed. Full access to engine and generator simplifies adjustment, even on the truck. Fits practically all makes of walkie and rider trucks up to 2000 lbs. *Write today for full information.*



READY-POWER

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Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

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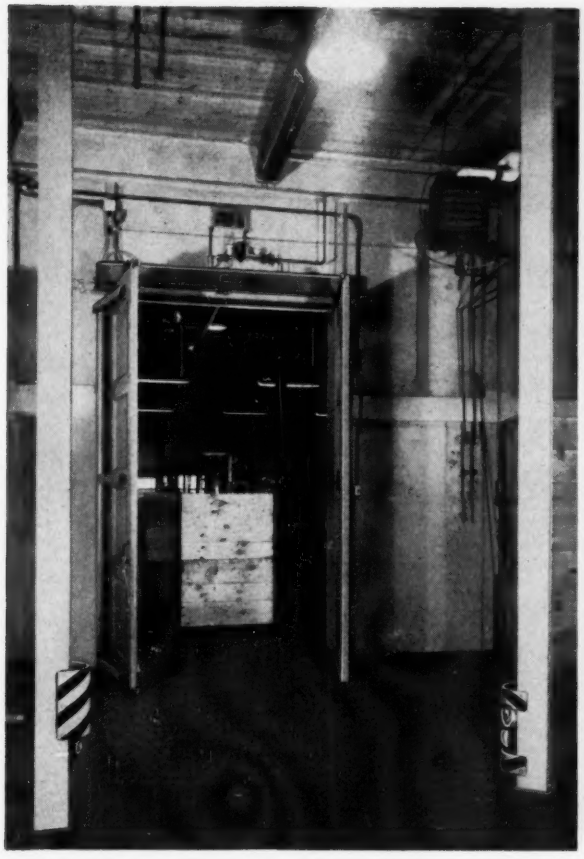
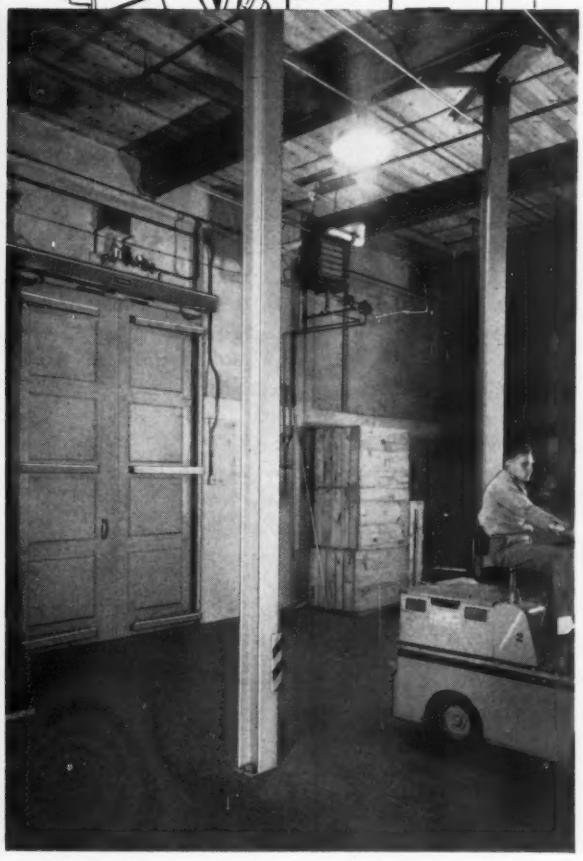
An open-and-shut case . . .





Mr. John Bartyzel, Warehouse Superintendent at the Consolidated Cigar Co., Glastonbury, Conn., says, "At six vital points in the warehouse, Stanley Magic Eye Controls save valuable time by opening and closing heavy doors automatically. Our operators stay on the truck and on the job."

In this warehouse, the *instant* opening and *positive* closing of the doors serves another purpose—protecting the crop in storage against the entrance of ruinous smoke. Whatever *your* specific door opening and closing problem, you, too, can rely on Stanley Magic Door Controls as the *automatic* solution.

FINE for speeding up traffic flow

STANLEY *Magic Door* CONTROLS

When it's a case of speeding up traffic flow in plant, warehouse or office, the verdict is always in favor of Stanley Magic Door Controls — Magic Eye* (photoelectric) or Pull Cord.

And the case for Stanley Magic Door Controls is just as airtight, whatever your requirement . . . *conserving conditioned air, controlling temperature and humidity, reducing damage to doors and equipment or improving working conditions!*

Write for complete information about Stanley Magic Door Controls. Call in your nearby Stanley Magic Door Representative (without obligation). He's listed in the yellow pages of your telephone directory.

* U.S. PATENT NO. 2,173,455

MAGIC DOOR DIVISION, THE STANLEY WORKS
DEPT. A, 592 LAKE ST., NEW BRITAIN, CONNECTICUT

STANLEY TOOLS • STANLEY HARDWARE • STANLEY ELECTRIC TOOLS • STANLEY STEEL STRAPPING • STANLEY STEEL

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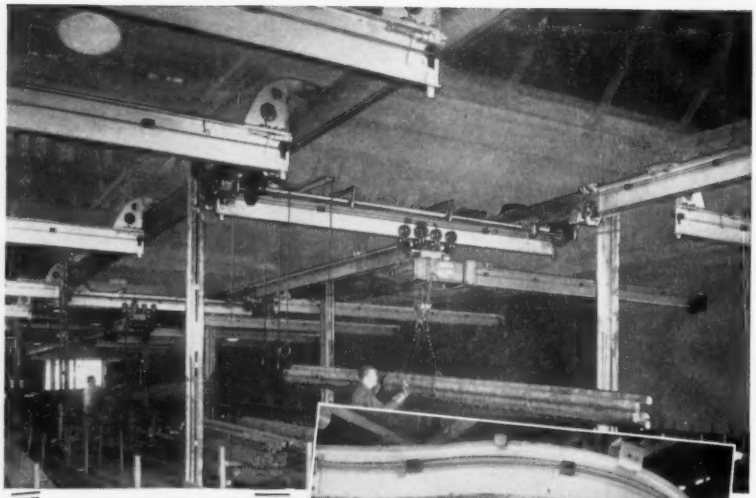
(*Continued from page 75*)

sired to hold a day's production to within one unit on a system which produces 60 units an hour, an accuracy of better than one part in 480 is required. Such an accuracy would dictate the use of a high-cost electronic speed regulator.

As a result of this need, there has been devised a simple, inexpensive system which has an accuracy of plus or minus zero percent over a period of time. This system is illustrated by Fig. 6. The basic reference for the system is the 60-cycle power supply frequency, which we all know is maintained to very close tolerances and periodically is corrected to zero error. A reference selsyn is driven at a *constant* speed through gearing by a small, fractional-horsepower synchronous motor. A feedback selsyn is geared to the conveyor, and the output of these selsyns is compared by means of a differential selsyn. As long as the reference and feedback selsyns turn at exactly the same speed, the differential selsyn does not rotate.

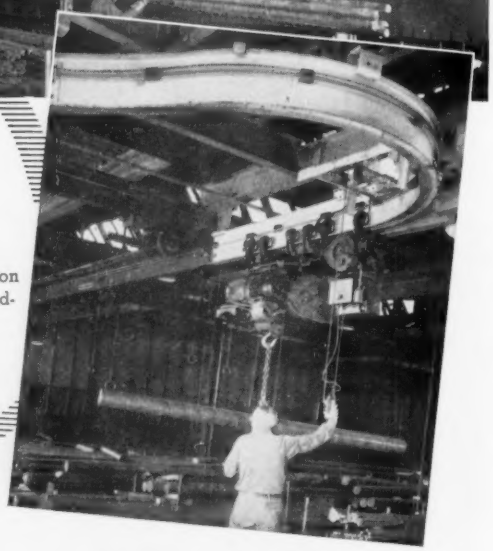
Suppose, however, that the conveyor loses speed for some reason, causing the feedback selsyn to rotate slower than the reference selsyn. The result is that the differential selsyn will rotate at a speed corresponding to the difference in speed of the reference and feedback selsyns. As the differential selsyn rotates, it drives a correcting rheostat in such a direction as to increase the field excitation of the generator, thereby correcting the speed of the conveyor.

The adjustable gear unit, which is shown in Fig. 6 between the synchronous motor and the reference selsyn, provides the means for setting the number of "jobs per hour" required from the system. The gear ratio is changed by means of three small levers. It is



Three existing craneways permit maximum use of floor area.

New MonoRail section of versatile up-and-over system.



new MONORAIL

ties into old for flexible system

A newly engineered section was added to three existing MonoRail craneways in this bar stock warehouse. As a result, incoming material can be picked up from a car and transported on this highly efficient overhead system to storage area. When the raw stock is needed, this up-and-over system has it there on schedule. If you have a materials handling problem, call your nearby American MonoRail engineer. He is qualified to help you answer it.

Photos courtesy of Super Steels, Inc., Chicago, Ill.

Member of Materials Handling Institute - MonoRail Association

AMERICAN MONORAIL COMPANY

OVERHEAD HANDLING EQUIPMENT

13129 ATHENS AVENUE • CLEVELAND 7, OHIO

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LANDAHL CONVEYORS SOLVE Three Handling Problems

- STORE BEDS OVERHEAD
- FURNISH MOVING DISPLAY
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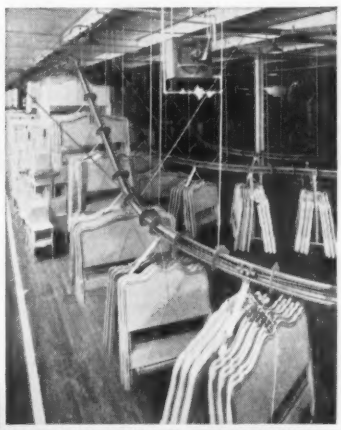

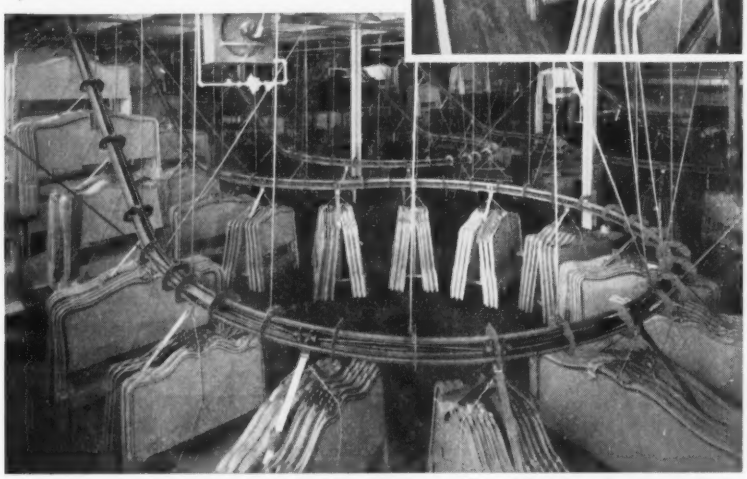

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adjustable from zero to 49.9 in increments of 1/10, or from 0 to 499 in increments of one. Dial indicators on the unit provide a visual indication of the setting, usually in "jobs per hour." For example, the system in Fig. 6 is set for 395 jobs per hour.

The dial plate of the master speed rheostat is also calibrated in "jobs per hour." Therefore, to set up a given production rate, the operator merely sets the master rheostat and the adjustable gear unit for the desired "job rate" and starts the conveyor. The selsyn production control will maintain the production rate until reset. Provision is made for changing the production rate without shutting down the conveyor.

Figure 7 shows the "reference selsyn assembly" and the "differential selsyn and correcting rheostat assembly" mounted in an operator's panel. Figure 8 shows the front of the same operator's panel with the "jobs per hour" dial on the right-hand side set for "160 jobs per hour."

Synchronizing of conveyors can also be accomplished very easily by the same scheme. In this case, the reference selsyn is driven by a master conveyor, and feedback selsyns are driven by one or more follower conveyors, which are thereby synchronized with the master conveyor.

The feedback systems described above are only several among thousands of systems in existence today, and, as the need arises, new systems will be conceived to meet the needs of industry. With increasing emphasis on quality control, automatic production systems, synchronized production lines, and more efficient production systems, feedback control will continue to play an increasingly important role in the progressive automation of industry.

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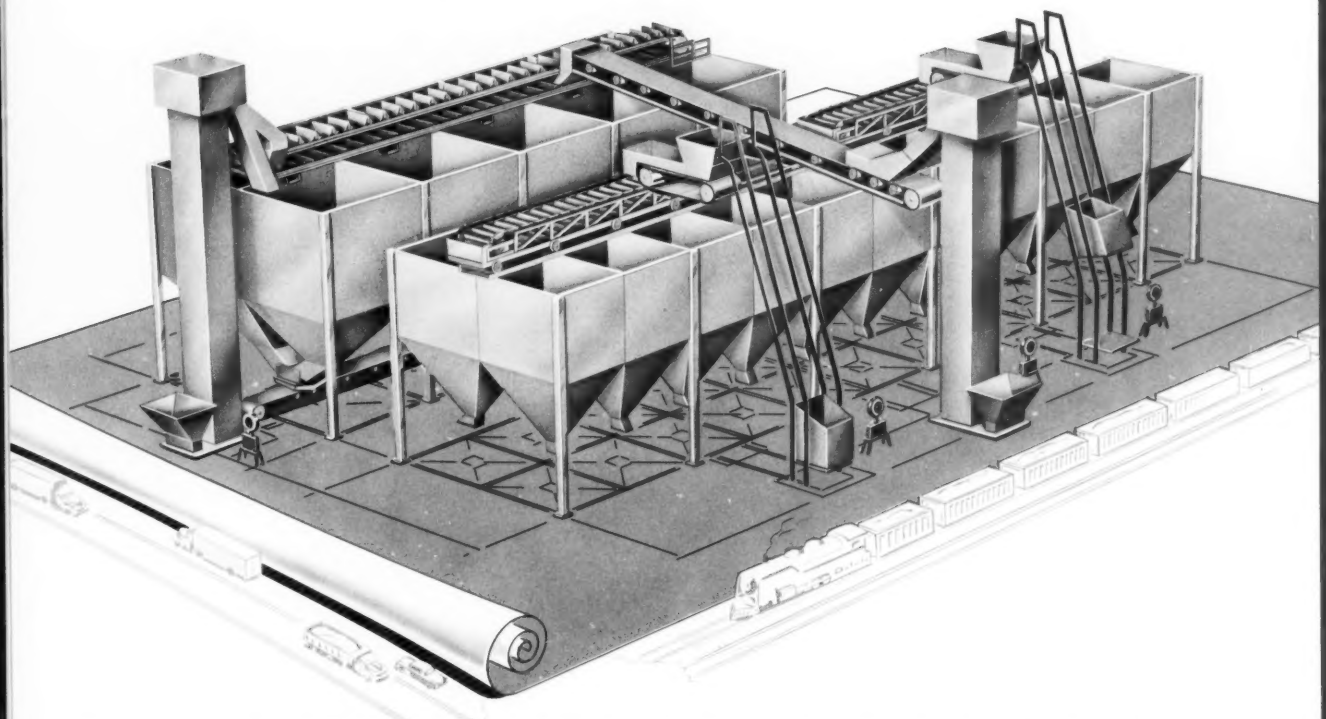

A constant regulated flow of brass remelt, in the form of chips and solids, is a vital factor in the cost and rate of production at Mueller Brass in Port Huron. The Webb conveyor system simplified their bulk handling operation —helped to increase their production—gave greater storage capacity—eliminated manual handling—lowered manufacturing costs.

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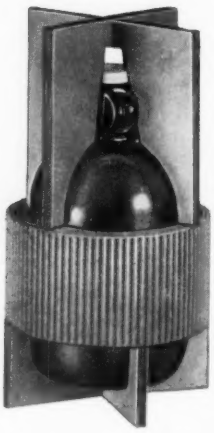

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JANUARY 1956

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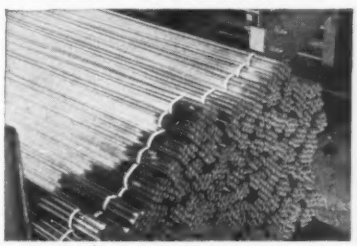

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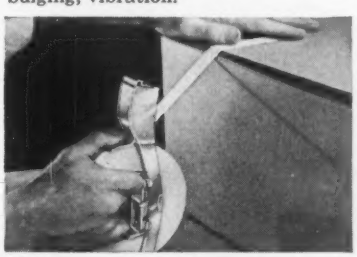

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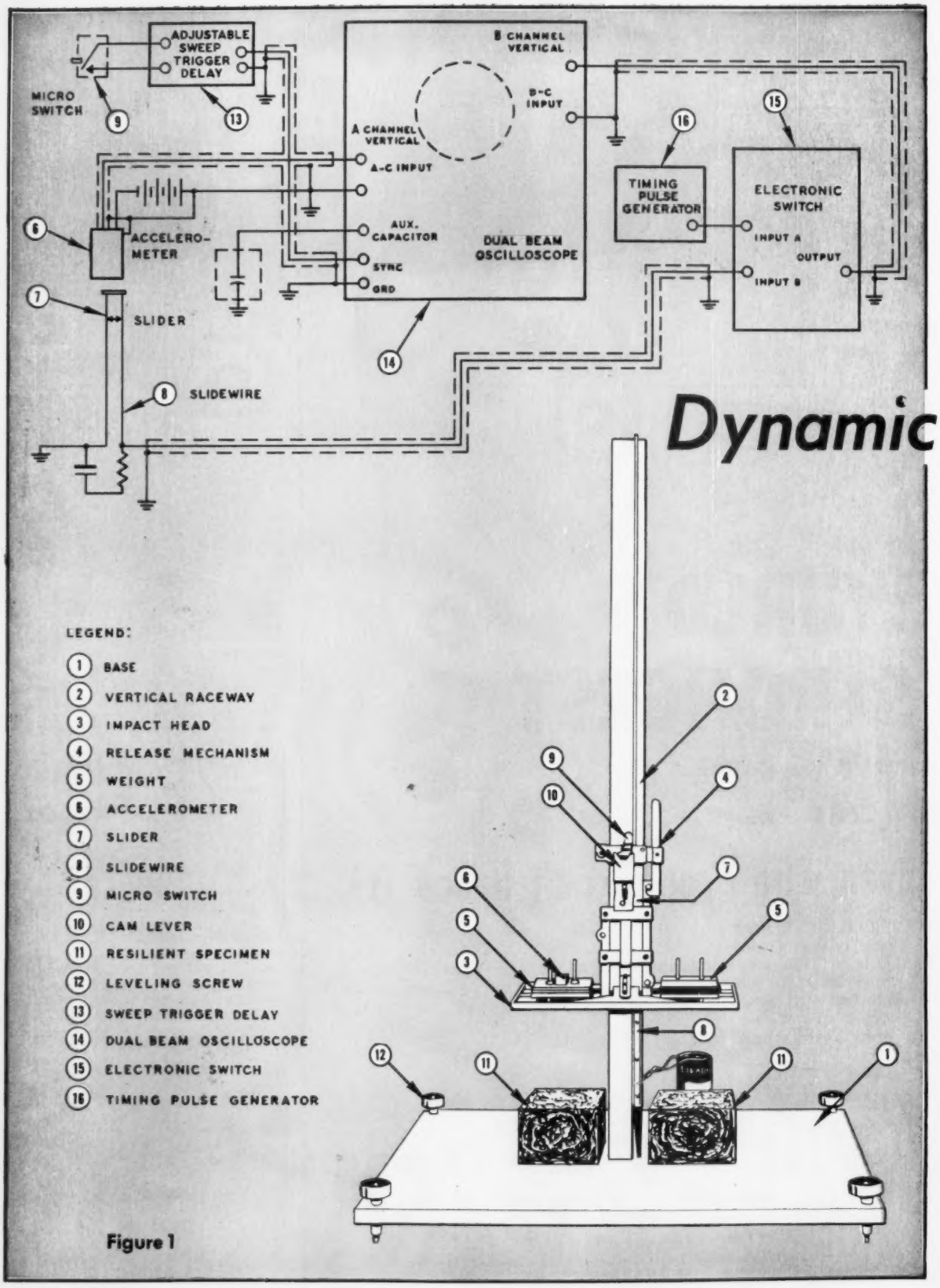
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A-C INPUT
AUX. CAPACITOR
SYNC
GRD
DUAL BEAM OSCILLOSCOPE
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TIMING PULSE GENERATOR
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Dynamic
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2 VERTICAL RACEWAY
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Figure 1

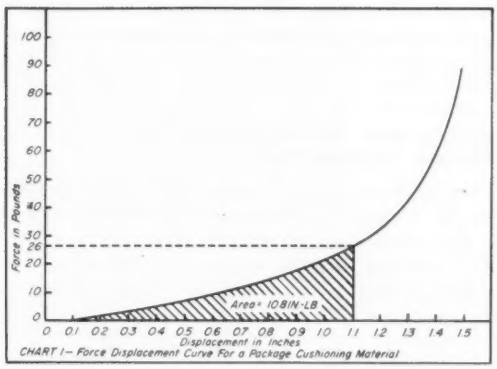


CHART 1— Force Displacement Curve For a Package Cushioning Material

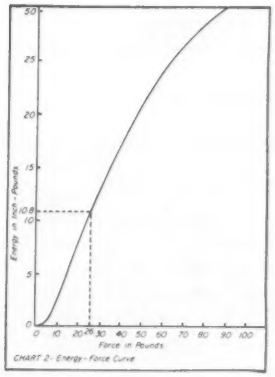


CHART 2- Energy- Force Curve

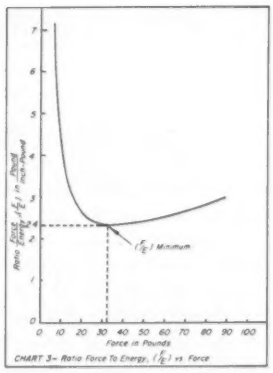


CHART 3— Ratio Force To Energy, $(\frac{F}{E})$ vs. Force

Cushion Testing Device

. . . a new aid to cushion design

by M. T. Hatae

EVER-increasing complexity of missile and aircraft functions has resulted in development of extremely precise and delicate instruments requiring care in handling. Nevertheless these instruments must be shipped to customers by all modes of transportation, to all parts of the world and will be subjected to handling by untrained personnel. Packaging techniques, until recent years, have been accomplished purely by empirical methods. The need exists for a more comprehensive knowledge of the characteristics of package cushioning materials and the design techniques applicable to their use. The dynamic cushion tester was designed and developed specifically to satisfy this need and was based on the concept of optimum cushioning.

Optimum Cushioning

Let us illustrate the concept of optimum cushioning with an example. Assume that we have a compression spring (approximately six inches in diameter with a free height of six inches) similar to those used in the front suspension of many automobiles. Place a rigid steel plate on top of the spring to serve as an impacting surface. Let us then take a safety pin, an automobile, and locomotive and drop each of them in turn onto the spring from approximately six inches.

Now let us examine the results of our drop tests. The compression spring was much too stiff for the small weight of the safety pin and so the spring did not deflect to store the energy of the fall. Thus, the total energy of the fall was absorbed by the pin with result-

Masaji Hatae, Research Engineer of the Packaging Unit of North American Aviation's Aerophysics Department, presented the above report at the recent NSIA Joint Military-Industry Packaging and Material Handling Symposium in Washington. It was agreed by a great number of the more than 900 attendees that Hatae's paper was probably the most outstanding in an exceptionally fine group of significant talks. Many expressed a desire for an opportunity to study in more detail the data he presented. FLOW is pleased to be able to fulfill those requests by publishing herewih Hatae's complete talk.

Continued

ing high loads. Because the compression spring was taken from an automobile, it deflects under the fall of the automobile. Energy is stored by the spring and the load on the automobile is proportional to the stiffness of the spring and its deflection. For the locomotive, due to the exremely heavy mass, the spring deflects till the coils of the spring "bottoms". In effect the energy of the fall exceeded the normal energy storage capacity of the compression spring, resulting in a high load on the locomotive.

Thus, for a given stiffness and free height of the spring, an "optimum" weight dropped from a given height will result in the maximum energy storage in the spring with a minimum restoring force applied to the weight. The spring is then being utilized with the greatest efficiency. For package cushioning materials, the "efficiency" is a measure of the ability to temporarily store a large amount of energy with a minimum restoring force applied to the packaged item. By the proper selection of the most efficient material, a package design can be engineered to provide the required degree of protection with a minimum of package cubage and material cost. A measure of the efficiency has been defined by R. R. Janssen of North American Aviation, Inc. in a paper entitled "A Method for the Proper Selection of Package Cushion Material and its Dimensions", and is denoted as the optimum cushion factors.

NOTE:

(1) *In reality,* $E = W(h + d)$ *where* $d =$ *deflection of cushion. However, when d is small in comparison to h, it is usually neglected.*

(2) $G = G' + 1$ *where* $G =$ *effective dynamic acceleration which is the sum of its dynamic acceleration* (G') *and the static weight of the component. (References NAA Report NA-54-727 "Some Important Factors in the Selection of Distributed Cushioning Material" by H. Himelblau, Jr.)*

Determination and Application of Optimum Cushion Factors

Excerpts from Janssen's paper will be used to illustrate the method of determining the cushion factors and their application to package design.

The optimum cushion factors are defined as J^{opt} and R^{opt}, where:

$$J^{opt} = \frac{f}{e \text{ min}} \qquad R^{opt} = \frac{1}{f} \text{ at } \frac{f}{e \text{ min.}}$$

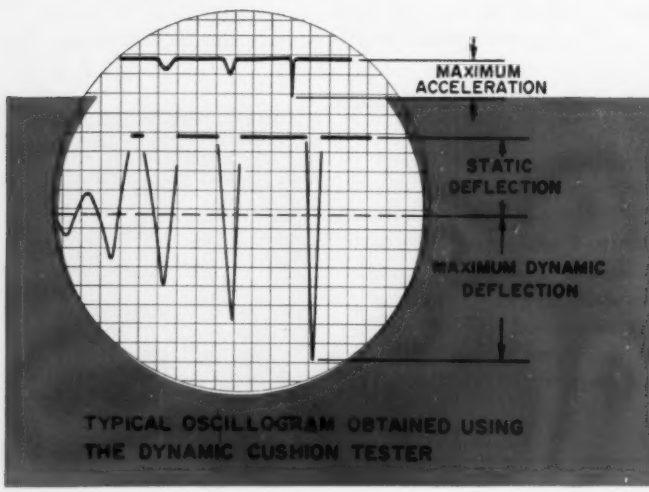
where: $f =$ force per unit area $= \frac{F}{A}$

$e =$ energy per unit volume $= \frac{E}{V}$

and: $V = AT$

Thus, $J^{opt} = \frac{\frac{F}{A}}{\frac{E}{AT}} = \frac{F}{E} \text{ min} \times T \qquad R^{opt} = \frac{A}{A} \text{ at } \frac{F}{E} \text{ min.}$

A compression test on a cushion material specimen will result in a force-displacement curve as in Chart 1. The energy storing capacity is the area underneath the curve. In Chart 1, E denotes the energy storage for force, F. Similarly for each increment of force the corresponding energy storage may be determined, and a curve of energy vs. force may be plotted as in Chart 2. Now, from Chart 2, the ratio of force to energy may be determined for each increment of force and a curve of F/E vs. F may be plotted as in Chart 3. As indicated in Chart 3, a minimum F/E occurs at a force F. Thus, with these values of F/E and F and the dimensions of the cushion specimen, the optimum cushion factors are determined from the equations previously developed.



TYPICAL OSCILLOGRAM OBTAINED USING THE DYNAMIC CUSHION TESTER

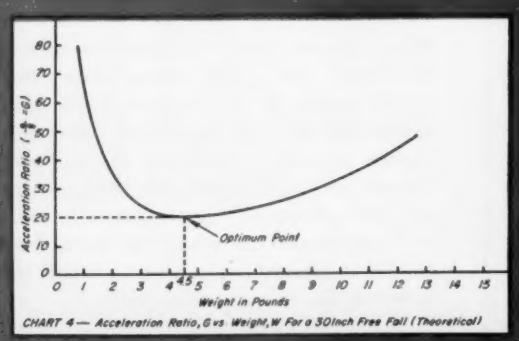


CHART 4 — Acceleration Ratio, G vs. Weight, W For a 30 Inch Free Fall (Theoretical)

The use of these factors in actual package designs can be effected by the following substitutions:

$F = WG$ where W = weight of suspended mass
$^{(1)}E = Wh$ $^{(2)}G$ = ratio of acceleration of item to acceleration of gravity
h = drop height

Then:

$$J^{opt} = \frac{WG}{Wh} \times T = \frac{GT}{h} \qquad R^{opt} = \frac{A}{WG}$$

By transposing:

$$T = \frac{J^{opt}h}{G} \qquad A = R^{opt}WG$$

and

$$V = AT = R^{opt}WG \times \frac{J^{opt}h}{G} = J^{opt}R^{opt}Wh$$

Thus, with the use of these two simple algebraic expressions, the cushion dimensions may be determined and utilized to obtain the required protection with a minimum of cushion material and package cubage.

Static Vs. Dynamic Optimum Cushion Factors

The optimum cushion factors, J^{opt} and R^{opt}, were determined by a slowly applied load, whereas, under actual conditions of handling and transportation shocks, the load is applied in a short increment of time. Drop tests of weights onto cushion specimen indicate a marked difference in cushioning properties from those determiend statically. The fundamental difference between the two methods of testing is the rate at which the load is applied. Assuming that viscous or velocity damping takes place within the material, the damping force is then affected by the rate of loading. The magnitude of the damping force has a decided effect on the acceleration-time characteristics as discussed in the "Dynamics of Package Cushioning" by Dr. R. D. Mindlin. Thus, with package drop tests used as a criterion of performance and the presence of viscous damping in package cushioning materials the dynamic rather than the static optimum factors should be determined.

Design of a Dynamic Cushion Tester

There are, at present, three basic dynamic testing methods:

(1) Free-fall of weight and cushion specimen as a unit.
(2) Pendulum method.
(3) Free-fall of weight onto a cushion specimen.

The dynamic cushion tester designed and built at NAA, Inc., is based on free-fall of weights on cushion specimen.

Basically the tester consists of: a vertical raceway; impact head with two impacting surfaces; a release mechanism, adjustable to any desired drop height; and a rigid base. The vertical raceway is constructed of 4130 steel, 2 x 2 x 45 inches long. A maximum drop height of 30 inches can be attained for a 5 inch thick cushion specimen. The impact head is of 24ST4 aluminum alloy plate, chemically milled to decrease the weight without loss of structural rigidity. Ball bearings are used to decrease friction and an adjusting screw has been provided to loosen or tighten the bearings on the shaft. Two impacting surfaces have been provided to eliminate any "cocking" of the head during the fall and rebound. The studs on the head are for the addition of calibrated weights. Two heads have been fabricated, one designated a light head weighing approximately 4 pounds and a heavy head weighing approximately 7 pounds. A third head, weighing approximately 2 pounds, is being fabricated to determine the optimum factors for light density materials. Weights can be varied in one pound increments to approximately 52 pounds. The base is 30 x 22 x 1 and constructed of 1020 steel. Leveling screws have been provided at the 4 corners of the base.

An accelerometer mounted on one side of the impact head and counterbalanced by an equal weight on the other side is used to indicate the dynamic response to the impact which is recorded on a cathode ray oscilloscope. A slider is located on the impact

(More on next page)

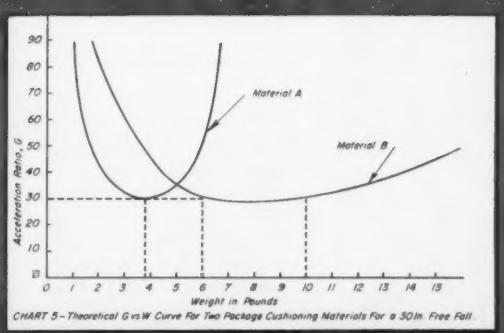


CHART 5 – Theoretical G vs W Curve For Two Package Cushioning Materials For a 30 In. Free Fall.

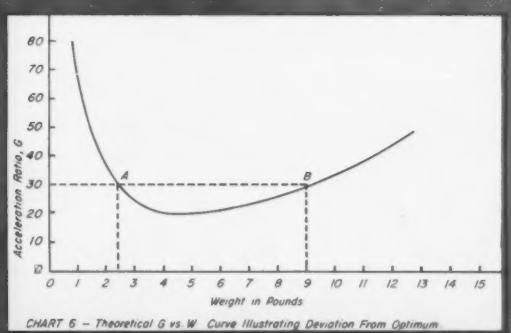


CHART 6 – Theoretical G vs. W Curve Illustrating Deviation From Optimum.

Continued

head and the slidewire attached to the lower portion of the shaft provides for displacement measurements on the oscilloscope. A time calibrated sweep will be used in the oscilloscope to obtain both acceleration-time and displacement-time characteristics. The entire response will be recorded permanently by an oscillograph camera attached to the oscilloscope screen.

Operation of Tester

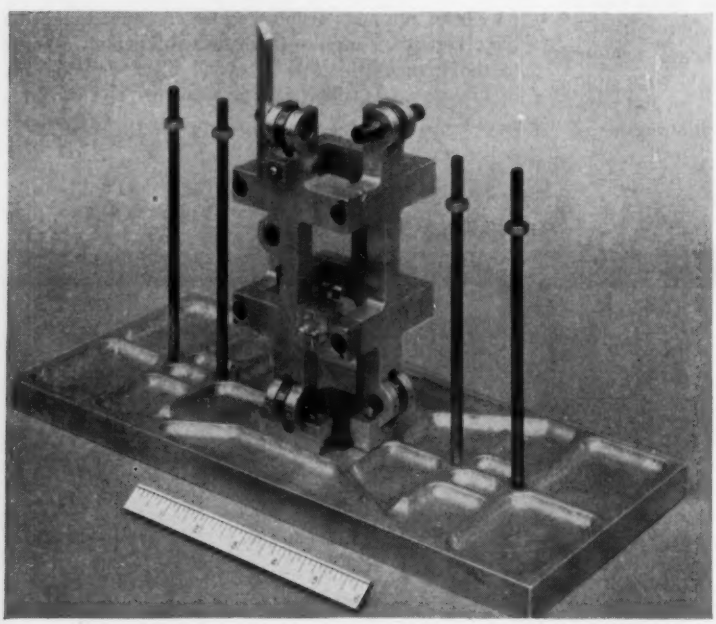
Two cushion samples of the same size from the same sheet are placed on the base directly beneath the impact head. The impact head is raised to the pre-determined drop height and fixed in position by the release mechanism. A cam lever attached to the impact head contacts a micro-switch on the release mechanism. As the release mechanism is tripped, the head falls freely and the cam lever opens the micro-switch which triggers the sweep through the oscilloscope. The accelerometer signal is fed to the vertical grid of the cathode ray tube. An adjustable sweep trigger delay is included in the circuit to time the sweep with the instant of impact. Thus, the acceleration pulse can be centered on the oscilloscope screen at any desired drop height.

As the impact head falls and strikes the cushion specimen, the slider on the head contacts the slidewire generating a second signal through the oscilloscope. The slidewire and slider form a linear potentiometer and as the slider travels down the slidewire, a change in voltage is effected and is seen as the image pattern of the head displacement on the specimen.

Optimum cushion factors will be determined following the procedure illustrated with the example of the safety pin, automobile and locomotive. A drop height of 30 inches has been generally accepted as a condition of rough handling. Maintaining a constant drop height of 30 inches, weights will be dropped and a curve of G vs. weight will be plotted to obtain an optimum weight as in Figure 6. The optimum cushion factors may then be determined from:

$$J_D^{opt} = \frac{GT}{h + d} \qquad R_D^{opt} = \frac{A}{WG}$$

where subscript D denote dynamic optimum factors and d is the displacement.



IMPACT HEAD of North American's cushion tester is constructed of 24ST4 aluminum alloy plate, chemically milled to decrease weight without loss of structural rigidity. Studs on the head are for addition of calibrated weights which can be varied in one pound increments to about 52 pounds.

A typical oscillogram obtained for a drop accompanies this report and shows maximum acceleration and displacement. Pulse shape and pulse duration may be determined from the oscillogram. Free vibration tests can be performed and the natural frequencies for increments of loads may be determined by counting the number of cycles over a duration of time. Also from the decay curve, the equivalent viscous damping ratio may be determined.

Calibration of Tester

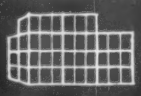
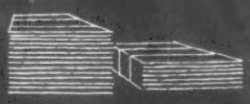
In order to determine the magnitude of the frictional losses and also to view visually the dynamic loading, high speed moving pictures were taken. Runs were made at 3000 frames per second for black and white and 250 frames per second for color. The film was then analyzed frame by frame to determine the velocity at impact. The velocity was then compared with the theoretical velocity for a 30 inch free-fall, 152.1 inches per second. It was found that the frictional losses would require a slight compensating increase in drop height. Analysis of the film led to the development of one further improvement.

A velocity measuring device was developed consisting of contacts embedded alongside the slide-wire. These contacts were spaced approximately ½ inch apart and the distance measured with a dial indicator to an accuracy of one ten-thousandth. These contacts were then connected to a series of terminals. Two leads from an electronic counter pick up any two terminals. As the slider

(Continued on page 114)

more Wirebounds used in 1955 than any previous year!

BECAUSE WIREBOUND BOXES AND CRATES

STACK BETTER  STORE BETTER 

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TOO BIG ...NOTHING TOO HEAVY

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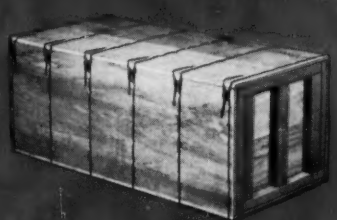

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slides over the contacts, the counter measures the time for the slider to pass from one contact to the other to one microsecond. Thus, the velocity at impact can be determined very accurately and any minor compensation for frictional losses can be effected.

Application of Optimum Properties to Package Designs

The shape of the G vs. W curve is very important in the application of the material to package designs. For a material exhibiting a G vs. W curve similar to curve A of Chart 5 with a sharp optimum point, any deviation from optimum would result in a rapid increase in load to the packaged item. Whereas, for a material with curve B, the J_D^{opt} remains relatively constant for a range in R_D^{opt} from W_1 to W_2. Thus, one cushion design for a suspended mass of range W_1 to W_2.

The use of the dynamic optimum cushion factors will lead to the minimum cushion thickness for a given allowable load and drop height. However, circumstances may arise for deviation from optimum conditions in order to effect a better design. For example, use of J_D at point A on Chart 6 would result in an increase in J_D and R_D from optimum. This condition may be desireable where the increase in thickness will be offset by the increase in bearing area required, thus, leading to a more stable package. At point B of Figure 9, J_D increases and R_D decreases from optimum resulting in an increase in required thickness and a decrease in required bearing area. If the product of J_D and R_D is less than the product of J_D^{opt} and R_D^{opt}, the result would be a decrease in the amount of package cushioning material required. Thus, this condition may be used where the savings from the material cost is greater than the cost of the increased cubage.

Upon determination of the cushion factors for a material, the dimensions of the cushion may be calculated for a given allowable load and drop height.

The dynamic cushion tester can be used to determine the dynamic optimum cushion factors to provide a more efficient use of materials. In addition, the tester will indicate the pulse shape and pulse duration of the response and the natural frequencies and equivalent viscous damping ratios may be determined. Thus, with packaging gaining more recognition as an integral part of the reliability of equipment, it is hoped that the developments presented will add one more step in the progress of packaging from an art to a science.

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Costs go down when loads go up

on ACCOPAK* Pallets

Low cost, expendable paper pallets cut loading costs up to 50%, unloading costs as much as 75%

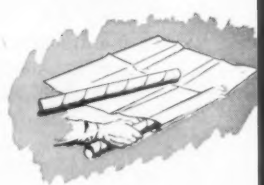
WHY DIDN'T SOMEBODY think of this before? An inexpensive pallet of kraft paper for quick, easy shipping and reclaiming of unitized loads . . . a pallet that gives shippers and receivers *all* the economies of multiple-decking in warehouses, freight cars or trucks . . . a pallet made of paper and paper tubing yet easily carries up to 4,000 pounds; costs so little it's disposable — that's the ACCOPAK Pallet, conceived by American Cyanamid Company engineers to speed handling of bagged commodities.

Thoroughly tested in Cyanamid's plants, ACCOPAK slashed loading costs and time up to 50% on most products shipped in bags. Savings on received shipments were even more dramatic. Now, its merits fully established, the ACCOPAK Pallet is available to industry.

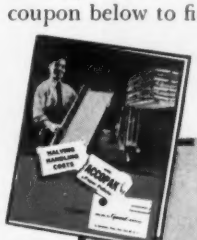
Here's how it works-

Paper tubes inserted in the side sleeves of the kraft paper sling provide easy access for bayonet-type forks which are readily attached to any fork lift truck. These forks lift the palletized load, and the truck then moves off to deposit the entire unit, in the usual manner, in freight car, truck or warehouse.

But, here's the *big* difference between ACCOPAK and other pallets. With ACCOPAK, loads can be multiple-decked without use of space-wasting platforms between tiers, yet upper tiers can be easily reclaimed without tearing of bags. With ACCOPAK, more cars can be loaded to maximum weight to meet minimum freight rates . . . unloading costs and time are sharply reduced . . . warehouse space can be used more efficiently.



If you ship or receive bagged materials, investigate the economies of ACCOPAK. Use the coupon below to find out how ACCOPAK Paper Pallets can effect spectacular savings in *your* handling costs.



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*Trade-mark

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Paper Chemicals Department
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Send me your descriptive folder, "Halving Handling Costs with ACCOPAK Paper Pallets."

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Company_____

Street_____

City and State_____

HIGH-SPEED COMMUNICATIONS in New York Central's Dewitt yards help keep operations on schedule even in bad weather. In foreground is insulated air tube which connects hump office and yard office.

Air Tube Speeds Humping

. . . in NYC classification yard

CLASSIFYING 2000 freight cars into nearly 20 westbound trains every day is a job that calls for some fast-moving paperwork. A bottleneck in assigning track numbers to outbound cars means delayed freight—and impatient shippers.

To help keep freight on the move, New York Central's Dewitt, N. Y. classification yards—the largest and busiest through yard in the east—has developed a streamlined communications system for hauling paperwork between the main yard office, the humping office, and the switching towers. The system consists of a pneumatic tube system and a battery of teletype machines. These communication elements link the key points in the classifying yards. The yards classify all freight westbound from New York State, New England and Eastern Canada, as well as eastbound freight trains intended for these destinations. Because of the lay-out of the yards only the westbound hump needs to be serviced by this communications system.

Here's how the system operates. Conductors' "consist" lists, which identify each car on an incoming train, are turned in at the main yard office. In addition to listing car numbers, each consist shows car type, consignee, consignor and contents. Each car on the list must be assigned a track number so that the car

CONDUCTOR'S CONSIST LIST is placed into carrier for transmission to westbound hump office where track numbers are assigned. Track listings, returned through the tube, are then transmitted by teletype machine to hump office and three switch towers.

COMPLETED CONSIST LIST is about to be dispatched back to main yard office by westbound yardmaster after he has assigned track numbers to outgoing cars. To send carrier, he starts blower motor at his station. Carrier makes 1/4-mile trip in 40 seconds.

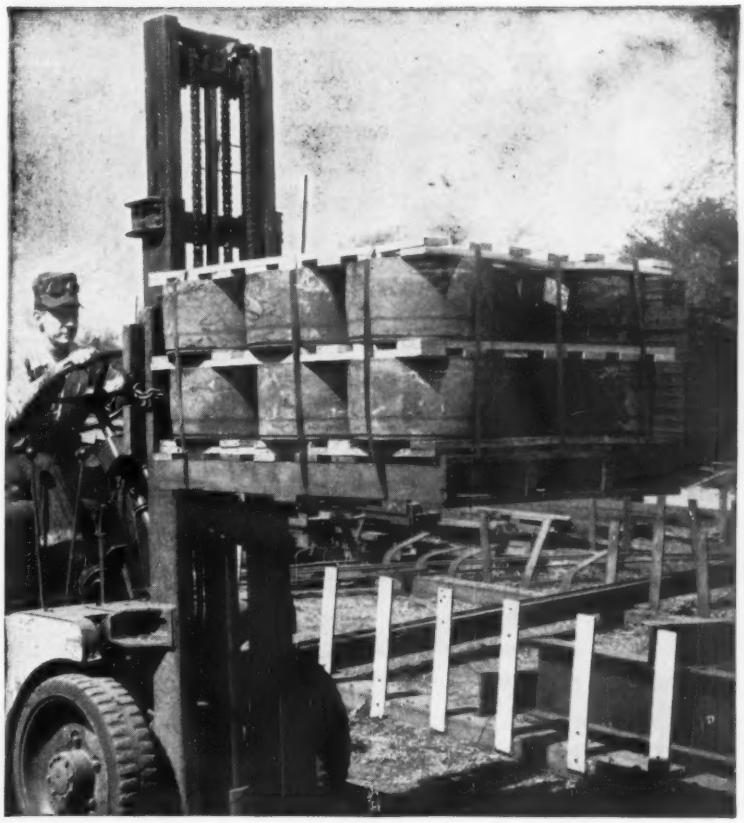
can be humped to the appropriate westbound train. It is the job of the yardmaster of the westbound hump to assign these track numbers, a process which involves a round trip between the yard office and the hump office for each consist processed.

In the Dewitt yards, these offices are about ¼ mile apart and would require a 10-15 minute walk in each direction over track and rough terrain. Instead, the pneumatic tube system, which links these two points, delivers the list in 30 seconds. To get the consist list processed, yard office personnel merely forward the sheets via the Airtube to the hump office. There, the yardmaster completes his work on the list and returns it to the main yard office. This pneumatic messenger saves about 25 minutes of transportation time per list, and saves, in addition, other delays that would inevitably arise if carried by hand.

The system consists of a 5½ inch, reverse-pressure, single tube system, with a sending and receiving station in both the yard office and hump office. Because of the relatively light traffic load, as compared with other penumatic tube installations, a single line was found adequate, thereby reducing installation and material costs. Each end of the line is equipped with a blower which creates the air stream that pushes the carriers through the tube. A system of interlocks prevents both blowers from operating simultaneously and makes it impossible for carriers to enter the line from opposite ends of the system at the same time. The tube line, being an outdoor installation, is mill wrapped to reduce weathering and condensation. In addition, the system is equipped with a condensate trap to extract any moisture that may form in the line due to changing atmospheric conditions.

When the completed list is received back in the yard office, the final step is to communicate track assignments to the three switch towers which control the 12 tracks radiating from the westbound hump and to the hump office. Yard

(Continued on page 127)



Signode unitizing method speeds truck handling of heavy castings

A manufacturer in Alabama sought a safer, lower cost way to ship heavy-wheel castings by motor truck to Michigan. With the co-operation of Signode's fieldman, a special unitizing pallet pack was developed. First, a heavier, stronger pallet was built. Two layers of castings, separated by a wood frame, and similarly capped, were strapped to the pallet. Six bands of Signode steel strapping, spaced for maximum unitizing efficiency, were applied. The new method of shipping saved time in loading and unloading. Handling safety was greatly increased. Cost of the pallets was self-liquidating, because the receiver bought them for inplant handling and storing of castings, and for intraplant shipping.

Get in touch with your Signode Fieldman! **He will be able to show you, too, how to make important savings in packaging, handling and shipping your products through the six basic unitizing methods. Quickest way to reach him is to write**

SIGNODE Steel Strapping Co.

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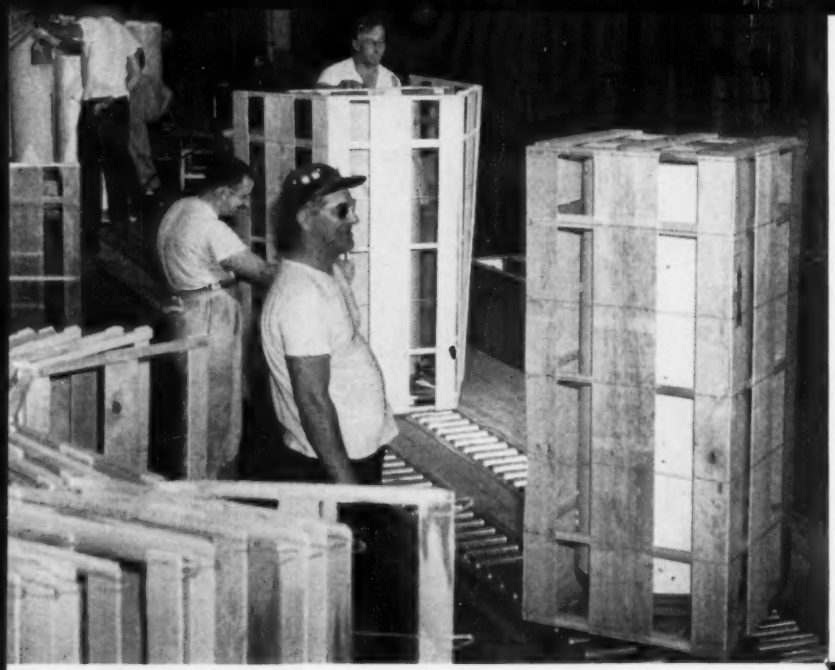

WIREBOUND CRATES are used at the Kankakee, Ill. plant of A. O. Smith Corp. for packaging of various size water heaters. Heater is assembled on crate base. At packaging line, crate top is placed on top, one-piece wrap-around blank is put around heater, wire-loops are fastened and unit is complete.

From A. O. Smith Corp. . . .

Finger-Lift Progress Report

By Albert W. Blatz
Staff Packing and Material Handling Engineer
A. O. Smith Corp.

FINGER-LIFT ATTACHMENT was designed for palletless handling of crated heaters. Fingers have saw-blade teeth to insure firm hold when crates are lifted.

A lift-truck attachment invented and perfected within our company (See FLOW, April, 1954) has proven itself through savings of upwards of $100,000 per year in direct labor costs for material handling after packing. Except for our two largest size containers, where special BB cleats are needed to permit three-high stacking of crated water heaters, conventional wirebound crates are used.

One truck operator now does in 45 minutes what five men formerly needed two hours to do. Damage formerly caused by heaters toppling from pallets in transit or by man-handling while being placed on or removed from pallets kept six men busy making repairs. Now there is virtually no damage to crated units.

The device that brought about all these economies is a lift-truck attachment consisting of a series of steel fingers mounted individually on a horizontal shaft. Even a slight pressure forces these fingers out of position.

Therefore, whenever a finger strikes a slat of a crate, it is pushed backwards out of the way while the other fingers pass between the slats. When raised on the mast of the truck, they engage either the BB cleat or the top of the crate to lift the package. The heaters

BETTER SPACE UTILIZATION is one of the most important results of the finger-lift. Truck loads two packaged heaters at a time into freight car. Warehouse aisles have been cut from twelve feet to eight feet wide; useable cube increased.

involved in the lift range from 150 to 750 pounds in weight.

Our water heater plant at Kankakee, Ill., can produce several thousand units per eight-hour day when working at capacity. Thus, a jam-up anywhere along the line causes a major production and shipping loss. However, five industrial trucks equipped with the finger-lift attachments work so swiftly and efficiently that crated units can not pile up at the end of the line.

To pick up a load, the truck operator simply drives his truck flush against the crates so that the non-lifting fingers are inactivated by being pushed back. He then raises the finger-lift attachment on the truck's mast and the crates are lifted free. He carries them to warehousing or loading.

A short length of regular steel-cutting saw blade is attached to each side of each finger with teeth pointed upwards and truckwards. The teeth bite into the wood cleats and keep the units from slipping off.

The maneuverability of the truck and the fingerlift attachment, plus a hydraulically operated side-shifting device, speed the final disposition of the load. Crates can be lifted and gently placed in stacks up to 18 feet high. Conversely, they can be gently lifted down from storage in like fashion.

Railroad car door openings permit passage of three heaters held abreast on the fingerlift attachment. Inside the car, the truck operator fits crates exactly into position, even two high, with little movement of the truck, thanks to the side-shift feature.

We believe our system is a dramatic example of economies that can result when scientific packing is merged with scientific handling. The wirebound type of construction of the crates we use, with intermediate wooden cleats securely stapled to steel binding wires and wooden slats, provides the inherent structural strength needed to withstand lifting by the sawtooth fingers.

Elimination of forks on trucks permitted us to reduce aisle width in our Kankakee warehouse from 12 to eight feet and increased tremendously our useable cube.

EASIEST, MOST EFFICIENT METHOD EVER DEVISED FOR ADDRESSING SHIPMENTS

Imagine—no labels or tags to prepare and apply, no bulky stencil boards to cut, no expensive equipment to buy. It's so simple: A "label-frame" is preprinted on the cartons by the carton manufacturer. The ship-to address is imprinted on the cartons within the frames with a small Weber handprinter and an inexpensive, paper stencil. Stencil is cut on a typewriter—separately or as by-product of your shipping paperwork. A clean, fast, systematic operation. Very inexpensive. (Handprinter costs just $14.50.) Get all the details. Clip the coupon.

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Unitizing Paper Shipping Sacks

by Ray Frase*

SHIPMENT of Multiwall paper shipping sacks containing materials of varying worth presents unique handling problems. Commodities which must arrive free from dust, foreign particles and breakage require care and planning in shipping because a torn sack usually means a complete loss.

In our opinion, essential requirements for efficient palletizing and loading of sacked materials are:

1. A light weight, low cost, and preferably expendable pallet.
2. A satisfactory bag flattening device.
3. A palletizing glue applicator.
4. A predetermined method of arranging and loading pallets in carriers.
5. Proper lift truck equipment; e.g. a small, easily maneuverable type with adjustable forks.

Why Flatten Sacks?

Flattened sacks require from 30 to 50% less shipping and storage space than do un-flattened sacks. As a result, they provide a substantial increase in the total number which can be loaded into a box car or transport truck. This same factor permits improved warehousing in a given amount of floor space. Handling of a unit load of flattened multi-wall sacks is easier and safer because the stack is straighter and can be tilted on the truck without danger of falling.

HAND PACKING, hand stacking and manual handling of paper shipping sacks often results in poorly packed units which are hard to stack. Product and personnel safety become problems because stacks are unstable.

UNITIZED SACKS permit fork truck handling. With filled sacks flattened, unit loads are more compact, saving considerable warehouse space. They can be stacked to greater heights without danger of shifting or falling.

*Ray Frase
Signode Addison-Semes Dept.,
Signode Steel Strapping Co.

Model A Bagpaker* makes one man a team

The Model A Bagpaker® makes large tonnage bagging of free flowing materials a one man operation—and up to 350 tons can be bagged per 8 hour shift without overtime.

All the operator does is hang the empty bags on the filling spouts. Accurate weighing, filling, settling and sewing are fully automatic.

Engineered and manufactured by Bagpak Multiwall Bag experts, the Model A Bagpaker® is designed for reliability and durability. In can be depended upon to give years of service—and to pay for itself in as little as one year. If you are interested in the utmost in economy and efficiency in packaging bulk materials, you'll want to have all the details on this efficient machine. For complete information on how the Model A can fit into your packaging picture write to:

International Paper Company, Bagpak Division
220 E. 42 Street, New York 17

International Paper COMPANY
BAGPAK DIVISION

BRANCH OFFICES: Atlanta · Baltimore · Boston · Chicago · Cincinnati · Cleveland · Dallas · Denver · Des Moines · Detroit · Kansas City, Kansas · Los Angeles Minneapolis · New Orleans · Philadelphia · St. Louis · San Francisco · IN CANADA: The Continental Paper Products, Ltd., Montreal, Ottawa, Toronto

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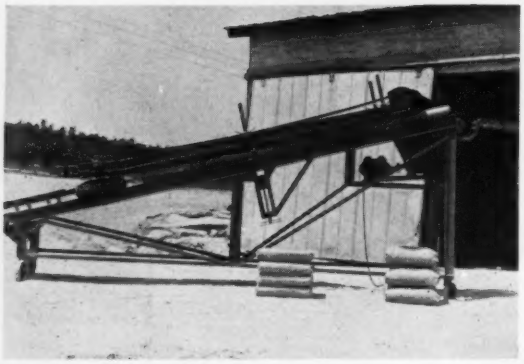
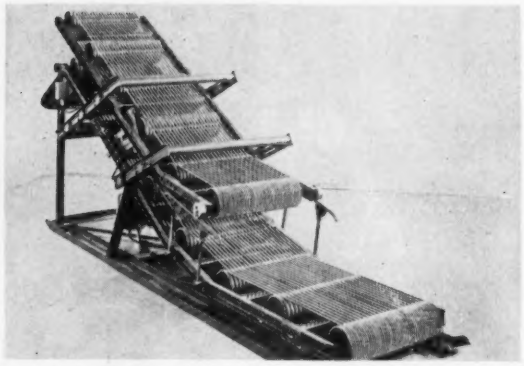


FLATTENED SACKS require from 30 to 50% less shipping and storage space than those un-flattened. A type of flattener is elongated unit in conveyor system.



FLATTENING DEVICE can be used separately from conveyors. A method is to install unit near filling station. Filled sacks are flattened, then palletized.

UNITIZING PAPER SHIPPING SACKS

Continued

When handled on conveyors, firm, well-formed flattened sacks transfer more easily and are less likely to snap and tear. A unit load built of flattened sacks contains more sacks, resulting in fewer lift truck trips. Their flat surfaces permit gluing to help prevent damage by lessening danger of load-shifting, vertical oscillation and humping in transit.

Sack flatteners are obtainable in two forms: a sack flattener itself, or an elongated unit which also serves as a conveyor. For application of palletizing adhesives, mount applicator at the take-off end of flattener.

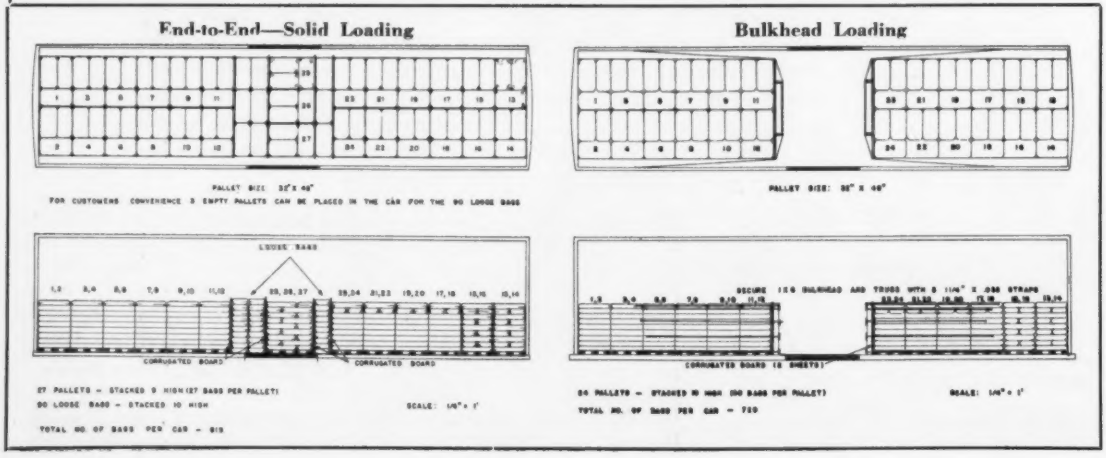
The pallet is placed in the freight car and the conveyor adjusted to deliver to it filled sacks onto which two strips of palletizing adhesive have been applied.

Standard Loading

A standard pattern for loading flattened sacks onto pallets has alternating layers of sacks, two lengthwise and one crosswise. There should be no more than one inch of overhang on all four sides of the pallet when sacks have been placed on its surface. This enables positioning of unit loads so that there are no voids between pallets.

The three sack layer pattern has shown the best results to date with the pallet size varying from 32 x 48 inches to 40 x 48 inches. Where both a sack flattener and glue applicator are used, the addition of a lowering turntable to simplify loading the pallet will further lower costs.

CARLOADING PATTERNS FOR FILLED MULTI-WALL SACKS



In selecting a fork truck to handle pallet loads it is well to remember that to prevent damage to adjacent pallets of sacks, the forks should be no longer than the pallet width.

Carloading

In most instances double door freight cars are best suited for handling unitized loads because they permit easy entrance and exit. Cars must be cleaned and have protruding nails pulled from the interior beforehand.

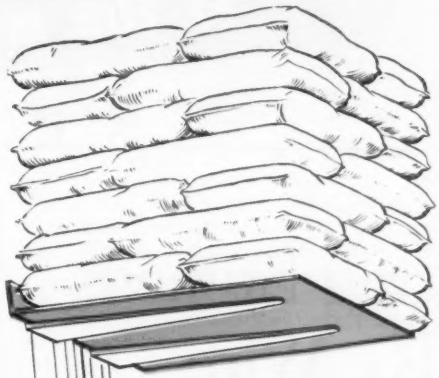
Two general loading patterns are usually used with the standard size freight car. Plans accompanying this article describe end-to-end and bulkhead methods of loading. The suggested order of loading using these two plans is indicated by the numbers on the pallets. The bulkhead plan adapts easily to loads of minimum capacity, while the end-to-end plan is suited to maximum loads.

A palletized load should be shoved tight against other loads to compact the entire carload, thereby reducing chances of shifting and damage in transit. This is an absolute requirement to successful palletized carloading. Chalk marking the car floor and walls to the pallet dimensions further insures well-placed loads. Often, before doors are closed, retaining strips are placed across the opening to hold the load away from the doors in case of shifting during transit.

Many important advantages can be gained from palletization of sacked commodities. For example, in one instance six men worked four hours to unload a 600-sack carload of 100-pound sacks of starch at a cost of $29 to $35 per car. It was decided to palletize the company's shipments.

Now, one man operating a fork truck unloads a car in less than on hour, saving from $27 to $33 per carload. Freight claims due to damage in transit are now almost non-existent and better customer relations are produced by delivery of a neat, easily handled load. Better housekeeping and inventory control have been made easier.

SAVE with Fork Trucks



MEAD board

and Chestnut POKE-PAK®

When you spot-glue bags on Chestnut Poke-Pak, you create a load that handles as one unit right through to final break-up. Only twenty-six units of 3000 pounds load a car, as against 780 100-lb. bags individually handled. What savings! Poke-Pak costs so little it's expendable after final handling. The specially-made fiberboard is hard, rigid, tough; supports any load; keeps center of gravity low. Superior to wood pallets with their annoying credits, return freight, charge-backs, splinters and nails that snag bags. Only end walls of cars need now be lined. Poke-Pak is economical, convenient for manufacturer, shipper, carrier, consignee, user.

FREE CONSULTANT SERVICE upon request; carloading diagrams, bag patterns, samples of Poke-Pak. Fits any size bag unit, truck or car. Write today for complete information, including interesting brochure.

THE MEAD CORPORATION

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DETROIT 35, MICHIGAN ..... 18045 James Couzens Hwy.
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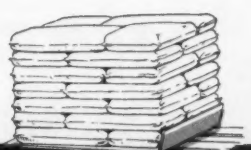

POKE-PAK COSTS SO LITTLE IT'S EXPENDABLE

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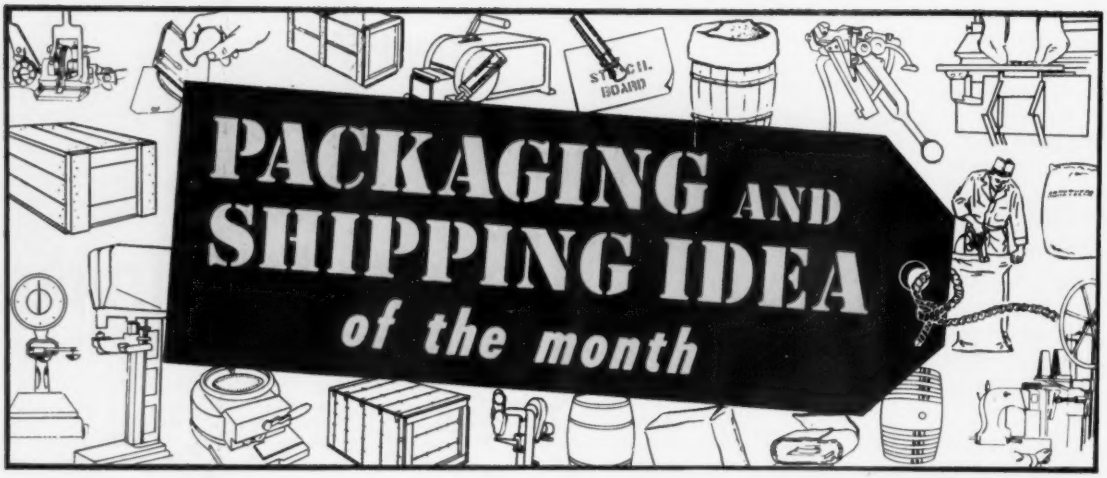
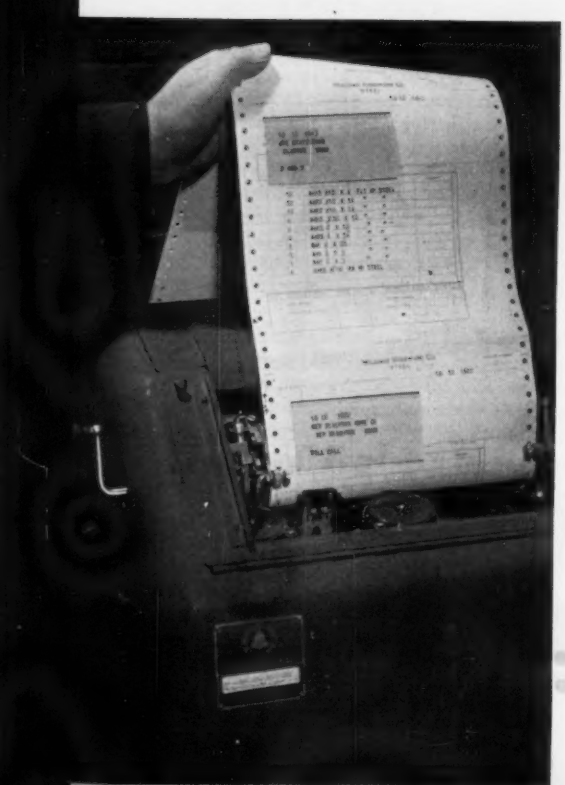


Cutting Stencils By Wire

As invoices are typed in the main office, teletype receiver in warehouse cuts shipment marking stencils.



CONSIDERABLE saving of time was effected when the Williams Hardware Co. incorporated the use of duplicator stencils for addressing of multiple shipments in their special teletype installation between the general office and the warehouse.

The simplicity of the system is based on the use of the special stencils which are used for addressing and marking as a by-product of normal office procedure. At the same time the teletype operator types the invoices in the general office on a master teletype machine, she is also typing the shipping copies and the label stencils on the receiving teletype in the warehouse several miles away.

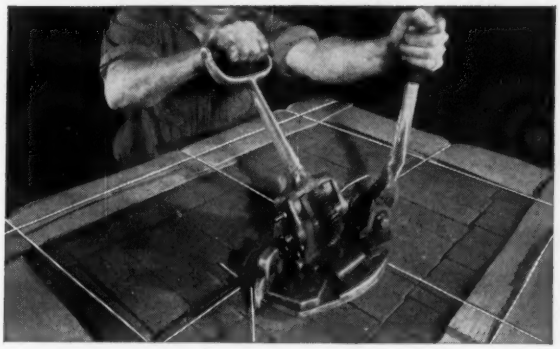
The stencils are pre-tabbed over the address area on continuous forms of combination order and bill of lading form before they are inserted into the receiving machine. This is done by folding a group of forms back in a fashion similar to thumbing through pages of a book so that the label stencil can be attached over the "ship-to" area on each form. Williams Hardware has found that an hour a day easily allows one girl to keep well ahead of actual needs.

The pre-tabbed pack of forms is then loaded into the receiving machine ready for use. As the main office operator types invoices, the receiving machine at the warehouse automatically types the addressing label and shipping copy. Thus, stencil making is a by-product of the regular typing.

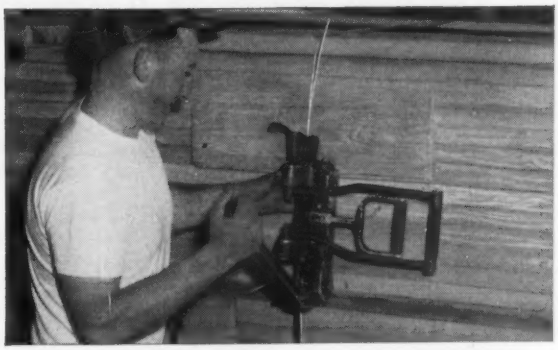
The stencil remains securely attached to the shipping copy until the shipping department removes and affixes it to the applicator. Unlimited impressions are then made directly onto cartons or tags until the entire order is completed.

Courtesy Sten-C-Labl, Inc.

How USS GERRARD speeds handling—cuts costs

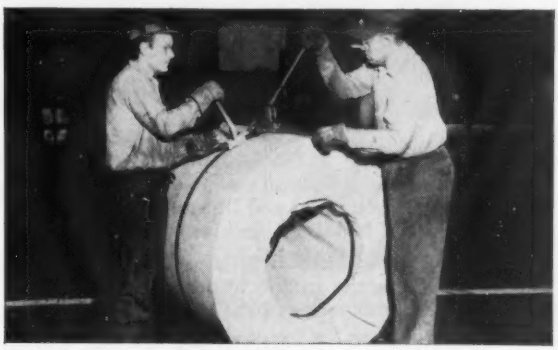


"We have been able to cut handling time, give our customers better service, balance our work load, save storage space, and reduce brick breakage through the use of USS GERRARD Round Steel Strapping," says Glen-Gery Shale Brick Corporation of Reading, Pa., largest building brick manufacturer in the East. Glen-Gery uses 12-gauge USS GERRARD Round Strapping to package bricks in easy-to-handle units of 500.



"We rely on USS GERRARD Strapping to get our houses to the building sites in perfect condition," says West Coast Mills, Chehalis, Washington, manufacturers of prefabricated Far West Homes. These attractive prefabs are shipped all over the United States by rail and truck, bundled securely with USS GERRARD Round Steel Strapping. They arrive consistently at the building sites with every piece intact.

"We reduced handling time by 75%, increased storage space by 33%, and cut shipping damage to less than 1%, by palletizing our tuyeres with USS GERRARD Flat Steel Strapping," says Climax Fire Brick Company of Climax, Pa., producer of 60% of the nation's requirements for these odd-size Bessemer Furnace fire bricks.



Waterproof-wrapped for shipment, this coil of sheet steel is being reinforced with USS GERRARD Flat Steel Strapping. Notice how strip of strapping inside coil exerts outward tension, keeping protective paper in place.

Bring your packaging-tying problems to USS GERRARD. Regardless of what they are, our engineers will help you find the safest, surest, most economical solution to them.

NEW CATALOG—HOT OFF THE PRESS! 36 pages of photographs, descriptions, facts and figures on all USS GERRARD Steel Strapping and associated equipment.

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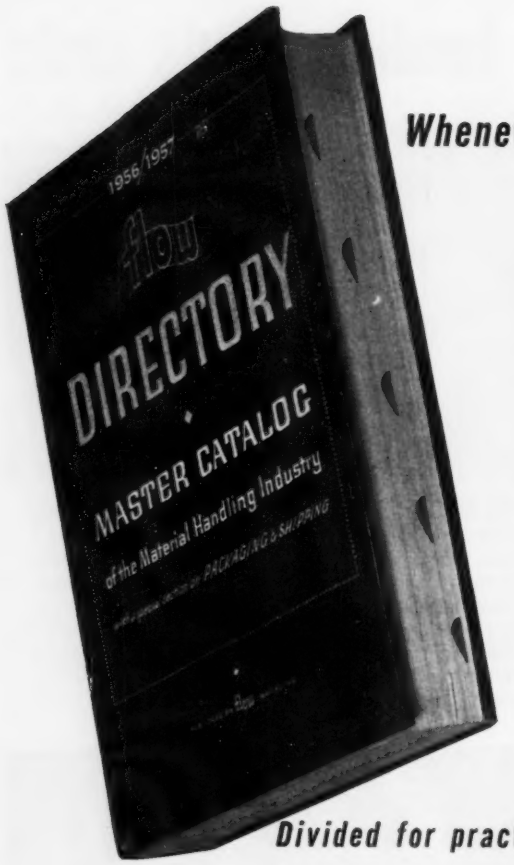

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AIR TUBE . . .

(*Continued from page* 117)

office clerks transmit the track assignments over a teletype machine and, within a matter of seconds, copies of the list are received simultaneously at all four points. As soon as the assignments are received, the incoming train can be moved over the hump and the individual cars switched to their assigned tracks by tower switch operators.

So efficient is this communications system, that the cars on an incoming train can be assigned and humped to outbound tracks within an hour after arrival. The contribution of the pneumatic tube system to accelerating the process can be gauged not only from the 25 minutes of travel time saved per list processed, but also from the amount of traffic that can be handled. Since paperwork of some type passes between the yard office and hump office on the average of every 40 minutes, a single messenger would be hard pressed to handle the load with even reasonable promptness. Equally important to Dewitt yard operations, which move on a round-the-clock schedule, the pneumatic tubes are always ready for use and are immune to delays from weather, time of day and other factors that reduce the efficiency of the usual messenger service.

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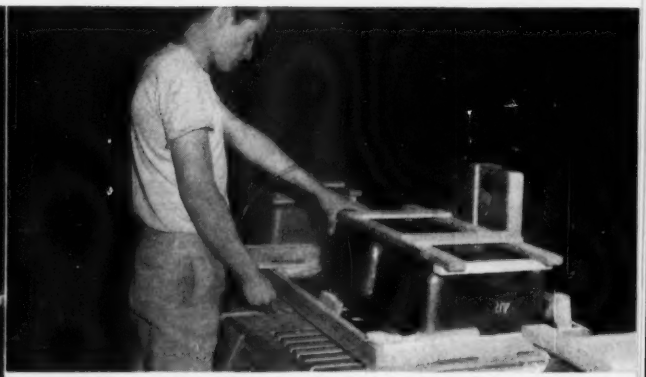
AIM to save packaging

Bundling cans with Acme Steel Strapping assures 50% faster assembly, better securement, safer shipments. Idea No. S2-4



The F-1 Strapping machine automatically tensions, cuts and welds Steelstrap for faster production line packaging. Idea No. S4-1.

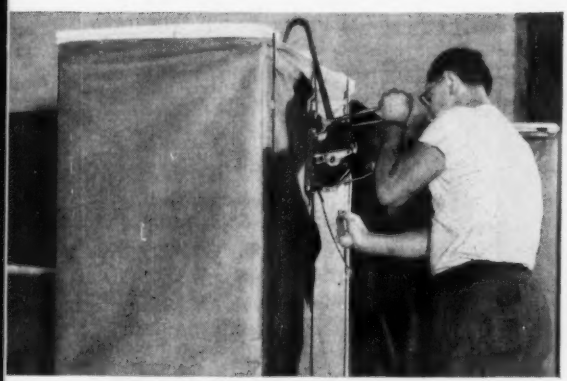
Better securement with steel strapping permits safe, more economical shipment of water heaters. Idea No. U1-1.

To realize more floor storage space, containers are assembled, and wire stitched as needed. Idea No. W1-6.

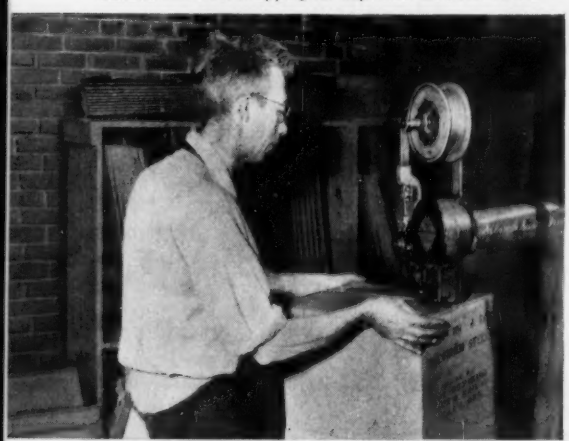
Fastening motors to wood bases with steel strapping resulted in a 10% saving in time and labor. Idea No. S7-6.

and shipping costs with these

Acme Steel ideas



Skids of paper are protectively wrapped and securely banded with steel strapping for shipment. Idea No. S3-12.



The Acme Steel Silverstitcher speeds carton assembly, gives in-transit protection of tacks and nails. Idea No. W1-2.

Acme Steel Strapping and Stitching ideas like these are but a few of hundreds that could conceivably work profits for you. They assure faster handling, less material expense, better use of warehouse space, better product protection and safe delivery.

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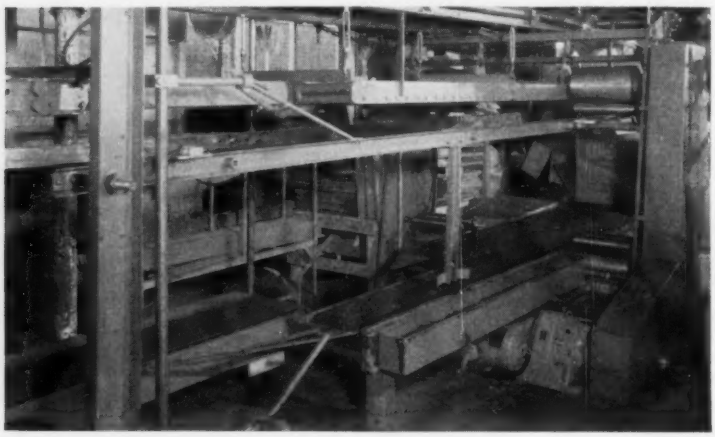
Straight-Line Top and Bottom Sealing

A NEWLY designed machine for closing and sealing one-piece slotted corrugated boxes packed with products such as major home appliances was unveiled recently by Hinde & Dauch Paper Co.

Significant features of the machine are a bottom flap closing device which eliminates the necessity for lifting heavy products into boxes and a power-operated flap closing mechanism which closes outer flaps instantaneously.



With the new equipment, packing of large boxes becomes a straight line operation. Boxes move through the machine without being pushed back and forth or around a right angle corner.

Photo at left shows an installation of the new equipment at Whirlpool Corp. As boxed units move into the flap-closing section, they are held upright by horizontal side guide bars. Power operated belts are arranged so that the top and bottom flaps on one side can be closed simultaneously, while the belt on the other side moves the unit forward. The flaps are closed by power-operated arms actuated by limit switches.

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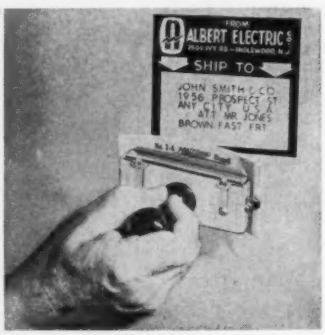
The Quick . . Accurate Way to Address Shipping Cartons



PRINT DIRECT

The MULTISTAMP Hand Stamp Stencil Duplicator prints shipping data direct on cartons, boxes, packages, and eliminates double operation of preparing labels and then pasting them on the containers. Handy as a rubber stamp . . . fully portable, non-mechanical, no moving parts to wear. Get 1,000 or more clear sharp impressions from one typewritten inexpensive stencil without re-inking. In photo above, shipper's name, address and "Ship To" label frame were preprinted by carton manufacturer.

THE ORIGINAL HAND STAMP STENCIL DUPLICATOR

IT PRINTS ANYWHERE

Model 1A shown in use above, complete outfit with supplies in sturdy case, $12.50. No. 3 Postcard and Large Tag Size outfit shown at right $19.50. Others, $9.50 to $99.50, F. O. B. Norfolk, Va. At office or shipping room supply dealers, or write for catalog, sample stencils and imprint.

OVER 30 YEARS

MULTISTAMP STENCIL DUPLICATOR

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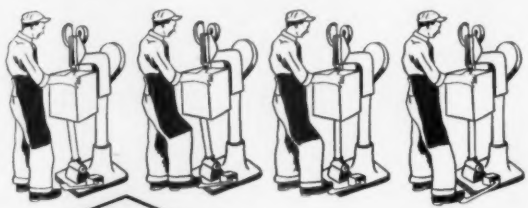

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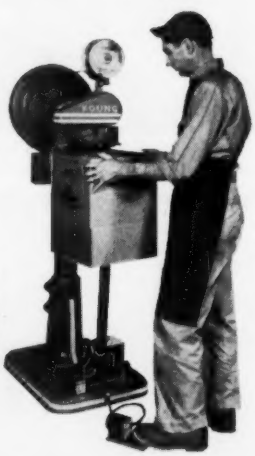

The Stitcher With The Plus Features

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FEEDING BY VIBRATION . . .

(*Continued from page 80*)

hopper opening at the equivalent of two-thirds the pan width—that means two feet deep on a three-foot wide pan, etc. For many good reasons, it is not practical to construct a feeder pan of this depth, and some other means must be used to generate a trough of sufficient depth to contain this extremely heavy feed bed. The most simple solution to this is to install skirtboards just inside of, but independent of, the sides of the feeder pan as illustrated in Fig. 3 and an accompanying illustration. In this a 4x8-foot vibrating feeder unit, operating at a 3/16-inch stroke, and feeding 600 tons per hour (24,000 cubic feet) of ROM coal, utilizes skirtboards to prevent spill of a 3-foot bed of material flowing from the bin.

The top of these skirts can generally be set at an angle equivalent to one-half the natural angle of repose of material (a/2, Fig. 3). With these stationary skirts, there is, naturally, a certain amount of restriction to flow caused by the friction of material against these stationary skirts, but this is insignificant in most materials under large stroke vibration.

For those materials having an extremely high coefficient of friction—such as coke, sinter, slag, etc.—skirts can best be designed with a slight outward flare, increasing in width towards the discharge end.

In an installation of this type, with a relatively heavy bed of material on the feeder pan, some consideration must be given to the pan-supporting members. True, with a relatively high-speed vibration, the mass is figuratively kept in suspension, but a certain definite portion of this, let us say, "live load" is reflected into the pan and supports. If the members (springs) supporting the pan do not have the proper capacity and resiliency, a severe shock and/or vibration would be transmitted into surrounding equipment and even to the bin in the case of a suspended feeder. All vibrating feeders, for that reason, should be furnished with proper coil spring or equivalent mounting.

Hopper Loads: Inevitably, one must encounter those cases which are contrary to all the time-tested standards in equipment use. One such chronic condition revolves about the limited vertical clearances, or "headroom", available in existing facilities. A typical illustration shows a 2x12-foot vibrating feeder installed below a hopper opening 1 foot, 9 inches x 10 feet. While this is not a very common occurence, it has been encountered a sufficient number of times to make it necessary to establish some basis on which similar problems could be handled in the future.

Needless to say, the scope of flexibility of this type of installation has some very severe limitations. The most important of these is that the material must be fairly dry and free-flowing. With a hopper opening 10 feet in length, it is only to be expected that a small portion near the discharge opening will be flowing at any appreciable rate, while the balance of the mass to the bin top and rear remains practically static.

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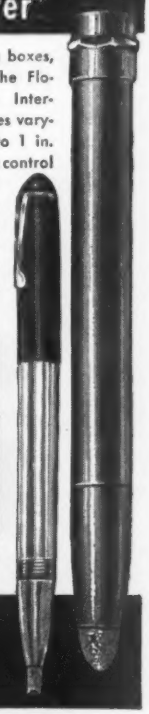
Speed up Your Shipments with the Flo-master*

When it comes to addressing boxes, crates, bags, cartons, etc., the Flo-master is an old smoothie. Interchangeable felt tips make lines varying in thickness from ⅛ in. to 1 in. Spring valve permits finger tip control of ink flow. Lightweight but sturdy aluminum construction. "Pocket Size" for general use —"King Size" for heavy-duty marking. Used with Flo-master Inks — instant-drying, waterproof, non-smudging.



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*A CADO Product

Cap of "King Size" may be screwed to bench to serve as stand.

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IT SHAKES AND SETTLES
AS IT FILLS AND WEIGHS

Cut production costs by packaging modern valve bags with an AUGER-MATIC. It fills them quickly to desired weight . . . it shakes and settles fluffy materials . . . shuts off automatically.

Valve bags fit snugly on AUGER-MATIC spout so no dust escapes . . . keeps bags clean . . . eliminates costly tieing or bag closing equipment.

AUGER-MATIC Bag Packer is equipped with multiple auger . . . packs any materials from powder to pellets. Easily moved from one filling point to another.

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FEEDING BY VIBRATION

Continued

The material in this static state is, however, still being subjected to vibration. Unless it is very free-flowing, it will eventually become severely compacted in the bin, causing a possible arching and consequently a stoppage of flow.

Still another aspect of this type of installation that must be analyzed carefully is the amount of material load imposed on the feeder unit.

Besides the problem of proper supports, there is the effect on the amplitude of vibration in the feeder unit. A vibrating feeder with a fine stroke should never be used for this type of installation as the hopper load will dampen it out to the point where a "bogging down" occurs. Even units having a relatively large stroke (¼-inch) are affected but still maintain a sufficient stroke to move the mass.

Considerable investigation was made to locate a standard formula which would apply to such a condition. Many were available, but all were extremely limited and subject to so many variables that they proved impractical. Therefore, knowing the limiting factors of this type of installation—i.e., free flowing material only—the Hewitt-Robins Research and Development Department undertook the problem of establishing a basis on which the actual hopper load to be supported by the feeder could be calculated. Obviously, this formula could never be exact or all encompassing, but it has been developed to the point where it can be applied to a large percentage of the bulk materials normally handled on vibrating feeders.

Most commercial hoppers are designed with side slope plates set at about 60 deg. for handling materials having a natural angle of repose of between 30 and 45 deg.—such as crushed stone, sand, coke, etc. In a hopper of this type, again for free flowing material only, the actual weight of material in the hopper itself that must be supported on the feeder pan can be established by the following formula:

$$W = \frac{2 \quad (a^2 \quad lw)}{3}$$

This formula would apply to the arched (parabolic curve) portion in the bin proper as shown in Fig. 4. The total load must also include that weight, contained in the pan proper, that has already left the bin.

Since there are always local conditions to contend with, this formula cannot be considered perfect, but will prove fairly accurate in most cases. Variations of this have been developed and used to cover a much wider range of extremes, such as hopper slopes of 60 to 80 deg., etc., but publication of these could lead to serious difficulty if they were improperly applied.

Multiple feeds: Another very common problem that comes up frequently is the use of one long unit under a series of bins or bin outlets.

Illustrated in the November Flow article, "Handling By Vibration," was a special springmount vibrating conveyor unit equipped with three adjustable feed

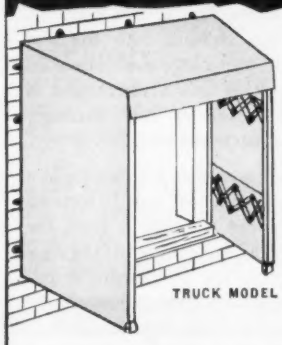
plates. The hopper openings should never be brought down to the pan proper in this particular type of installation. If they were all discharging directly into the pan, a serious problem would be obvious when the discharge from one chute approached the subsequent loading points. By installing the special feed plates, we have, in effect, a separate feeder below each bin opening, eliminating obstruction to the flow.

An illustration in this (January) article shows still another variation in feeder application. Here, a vibrating conveyor was designed to accept the feed from one source and distribute it at variable capacities to any combination of three vibrating screens. Similar units have been used successfully in feeding kilns, dryers, bins, and the like.

We could list dozens of additional variations in the design of vibrating pan feeders to suit many special and unique conditions, such as grizzly units, spreader feeders, etc. In fact, to present a through picture of the history and future of this unit would take volumes and would quite naturally result in a serious deviation from our original intent—to generate a better understanding of the sound principles of the application of vibrating feeders to achieve a better flow.

For photos and data, FLOW thanks, in addition to Hewitt-Robins Inc., the following firms: Jeffrey Manufacturing Co.; Richardson Scale Co.; Simplicity Engineering Company; and Syntron Co.

Tunnels for Safety



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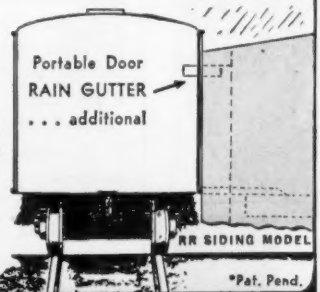

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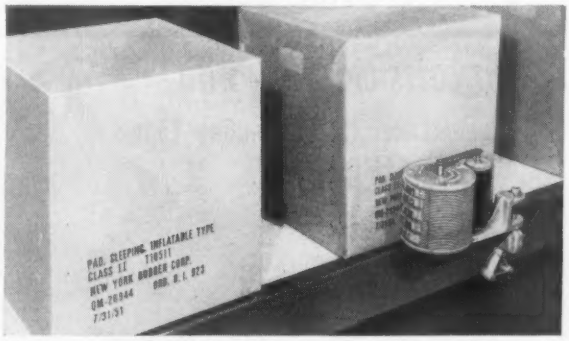
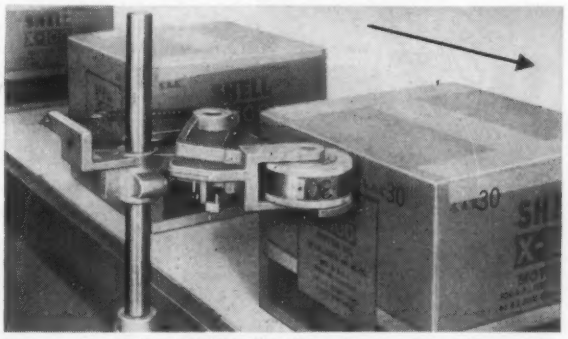
Low-cost marking attachments save thousands of $ every year

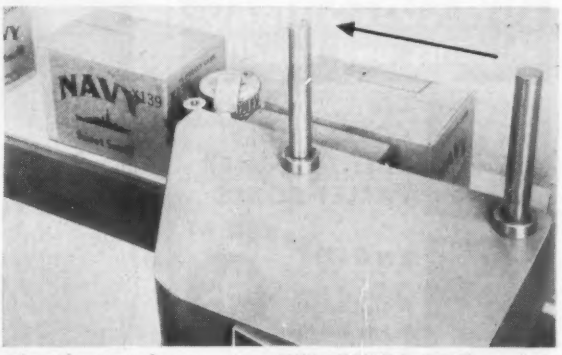
Compact ROLACODER machines mark 1, 2 or 4 sides of cartons, cases, drums, bags, etc. automatically



Friction-operated ROLACODER "100" machine makes single, accurate "spot" imprint of brand names, varieties, code-dates, lot numbers on one side of containers as they travel on conveyors or through case-sealer. Prints from 1 to 5 lines of copy up to 12" long from easily interchangeable rubber type.



Twin-action ROLACODER "500" marker marks codes and lot numbers on *front* and *one side panel* of cases simultaneously . . . in a single pass. Friction-operated . . . imprints legends containing up to 8 letters and figures.



Solenoid-activated twin-action ROLACODER "200" machine imprints codes and lot numbers on *rear* and one side panel (or rear only). When mounted in tandem with ROLACODER "500" machine, cases can be marked on all 4 sides simultaneously without requiring that they be turned.

Write for new Bulletin "ROL-2"

Gottscho

ADOLPH GOTTSCHO, INC.
Dept. D, Hillside 5, N. J.

Automatic CODING, MARKING, IMPRINTING MACHINES

In Canada: RICHARDSON AGENCIES, LTD., Toronto & Montreal

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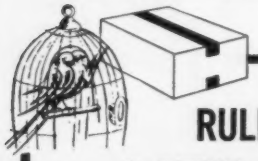
Circle No. 53 on Reader Service Card for more information



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2-STRIP CENTER-SEAM SEALING

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32-T

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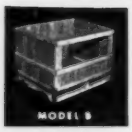
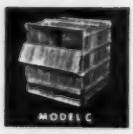
Cut Your Shipping Room Costs!
Write now, Dept. F for free booklet about 2 strips and the Derby 32-T

DERBY SEALERS, INC.
DERBY, CONNECTICUT

For MODEL A
LOW COST STORAGE
shipping and handling



USE...
COLLAPSIBLE
TIGHT-CORNER
PALLET BOXES



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- Specially Made For Your Needs

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DOCK COVERS
GIVE
YEAR 'ROUND PROTECTION

CAPCO Dock Covers completely enclose the space between car and building doorways protecting loading and unloading during bad weather . . . preventing accidents . . . insuring against loss of heat or refrigeration. 51 different models in any size for every loading problem.

Write for literature and name of nearest distributor.

CAPCO
622-24 PROSPECT AVENUE • KANSAS CITY 24, MISSOURI

Circle No. 38 on Reader Service Card

SINGLE SUPPLY SYSTEM . . .

(*Continued from page 66*)

Process Test:

As the chassis comes by the head of the test line on the overhead conveyor, the operator removes those units color-coded for her line—employing an air-drop similar to the lift used for loading carriers in the chassis-build section.

The process test conveyor is a steel slat-type, 26 inches wide, about 100 feet long, powered by a 1 HP motor and 6:1 variable speed drive with maximum speed of 26 inches per minute. Power for testing the chassis is supplied through four 10-KVA regulating transformers which are, in turn, connected to copper bus bars mounted beneath the conveyor. On every sixth steel slat, there are two bronze collector fingers which ride on the bus bars. Next in the circuit is an isolation transformer, followed by a circuit breaker and finally a standard two-pole electrical receptacle mounted slightly below the surface of the conveyor slat.

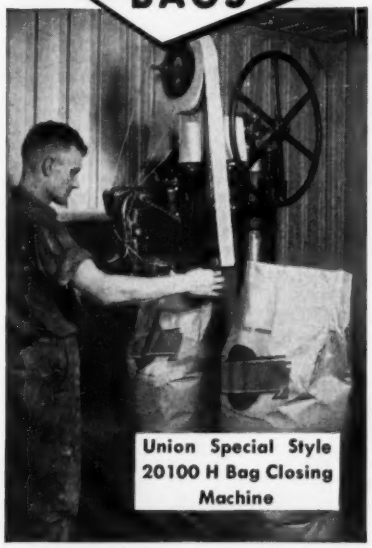
The first operator removes the chassis from the overhead conveyor, connects the test harness, shoves the chassis onto the slat conveyor, and plugs the chassis in. The result of this arrangement is that the chassis is "hot" throughout the test operation.

In the event that a tester finds a chassis that does not function properly, she unplugs it from the conveyor and shoves it off the conveyor onto the troubleshoot and repair line—a steel bench 30 inches wide, running parallel to and extending the full length of the slat conveyor. The troubleshooter replaces this chassis with a set which he has repaired and retested; the tester plugs the set in and lets it proceed to the next position.

Cabinet Assembly:

When the chassis reaches the end of the process test line, the last operator removes the test harness, disconnects the power plug, and—using an airlift—places the

Here's how to close **MULTIWALL PAPER BAGS**



Union Special Style 20100 H Bag Closing Machine

FOR lower production costs ... stronger, neater closures ... ability to get out rush orders in a hurry, you can't beat Union Special Bag Closing Machines! Specially built to stand up under heavy production schedules, these machines provide the high output rates needed to meet modern competitive conditions.

In the Union Special line, it's easy to find the right unit to meet your requirements. ASK FOR RECOMMENDATIONS.

SEND FOR THIS BULLETIN!

It's easy to find just the right unit to meet your individual needs in Union Special's big line of bag closing machines. Ask for a copy of Bulletin No. 200, "UNION SPECIAL FILLED BAG CLOSING MACHINES."

Union Special

MACHINE COMPANY

415 N. FRANKLIN ST., CHICAGO 10, ILL.

Circle No. 184 on Reader Service Card

tested set on a carrier of the third overhead system, which passes across the end of the four test lines. This conveyor, about 1200 feet long, carries the tested chassis and picture tubes to the cabinet assembly lines on carriers spaced at 4 foot centers. Conveyor speed is approximately 32 feet per minute maximum, with 6:1 variable speed drive by two 1½ HP synchronized drive units.

After passing the test lines, the conveyor moves up to the second floor—primarily a storage area where chassis, picture tubes, and cabinets are kept until needed for final assembly. It goes around the perimeter of a rectangular area where tested chassis are stored on roller conveyor racks. These are three tiers high, totalling about 4150 feet in length, with a slope of ⅜ inch per linear foot.

It is intended that the chassis should move from test directly to cabinet assembly. When this is the case, chassis remain on the overhead conveyor. However, if changes are made in models being run on the cabinet lines, we do not want them reflected back through test and chassis-build. When Cabinet Assembly is not using the chassis currently being tested, that chassis is manually removed from the overhead conveyor, placed in the storage rack, and replaced by the chassis required.

On the opposite side of the overhead conveyor, another group of handlers loads picture tubes onto the conveyor from tube racks brought to the loading point by fork truck. These racks are used between the glass factory (where the "envelopes", or bulbs, are made) and Sylvania's tube plant, and between the tube plant and our Batavia assembly plant. They can be stacked, and the leg or space sections on the four corners are removable to save space.

The return side of this third overhead conveyor, then, transports chassis and matching picture tubes to the four final assembly lines on the first floor. A color code system is used to identify the carriers. There is a separate color for each set of Process Test and Cabinet Assembly lines; picture tubes are also loaded on the carriers according to this code.

THE

SnakeTape

IDEA...

*For rail shipments under Rule 41 U.F.C.

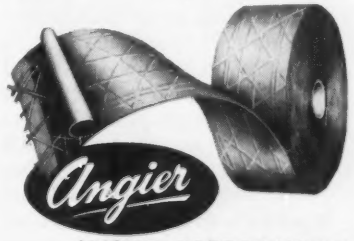
use 2 strips only!

CUTS LABOR 2/3 because you seal only the two center seams!

IT'S STRONGER because *reinforced* Snake Tape has strap-like strength. *Strength* you'll find in no other gummed tape because it's reinforced with *rayon* yarns . . . the same rayon yarns used in the best auto tires for superior shock absorbence.

PROVE TO YOURSELF, and at our expense, how much you can save in sealing time and in damage claims. Send for FREE sample of Angier Snake Tape now.

Free - 15 yd. sample



ANGIER CORPORATION
Framingham 13, Mass.

Circle No. 17 on Reader Service Card

SINGLE SUPPLY SYSTEM

Continued

Chassis are unloaded from the conveyor and placed on a gravity roller conveyor, where they pass through a final test. They are then transferred to a length of roller conveyor for temporary storage immediately ahead of the point where they are inserted into cabinets.

Picture tubes are removed from the overhead conveyor and placed on a temporary storage rack where faces are wiped clean. From that rack, a final assembly operator picks up a tube and assembles it to the cabinet.

Cabinets Load Via Reciprocating Lifts

Meanwhile, from storage on the second floor, cabinets are delivered by grab truck to an area directly above the final assembly lines—for unpacking, inspection, touch-up and repair. Once a cabinet is judged O.K. for assembly, it is placed on a conveyor which feeds into a reciprocating lift unit. There are four of these, one for each of the cabinet assembly lines. Table models are handled on top of the shipping cartons to bring them up to a suitable working height on the lines. Console model cabinets and cartons are handled as separate units.

The feed unit is a slat conveyor with rollers for cross bars rather than the usual steel or wood slats. When the lift car is not in loading position, a hinged stop at the end of this feed conveyor is arranged so that pressure of a cabinet or carton against it will trip a limit switch and stop the conveyor. With the feed conveyor stopped, operators loading it can use the roller bed as a standard gravity roller conveyor and group units tightly together for feed onto the lift.

As the lift reaches the second floor, the stop drops out of the way, and items start to feed onto the car. It is equipped with a belt conveyor running at a higher speed than the feed conveyor. Thus it pulls the unit to be loaded away from the unit behind it. A photoelectric cell, with its beam shoot-

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NO FLATS with NOTATS

An unretouched photograph showing Laminated NOTAT TIRES performing under adverse conditions over aluminum clippings.

Now there are THREE kinds of tires . . . pneumatics, solids and Notats (Notats are neither solid nor pneumatic—they're LAMINATED!) This means that Notats can't go flat like pneumatics (there's no air chamber). And — unlike solid tires — Notats will "give" to prevent jarring of loads and damage to equipment. At in-plant speeds, Notats ride and steer like pneumatic tires. Notat's molded-together pads *grip* instead of *slip* . . . give faster starting, faster stopping.

For longer tire life, easier steering, better traction and no tire trouble, switch to NOTATS. In sizes from 4.00 x 8 to 9.00 x 24. Write for price list and catalog.

THE ORIGINAL LAMINATED TIRE — ACCEPT NO SUBSTITUTES

The Plant Engineer of General Smelting Company (Philadelphia) reports: "Flats in pneumatic tires cost us too much down-time loss. We tried solid tires, but they were too hard on the men and equipment. Then we heard about Notats and tried them. They've solved our problem . . . no flats, no down-time due to tire trouble, yet they ride and grip like pneumatics".

NO TUBE AIR TROUBLE

NOTAT TIRE COMPANY
1504 EAST 34th STREET
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WITH EVERY ADVANCE FEATURE FOR EFFICIENT ASSEMBLY OPERATIONS

This wide span, three motor, cab-controlled crane is ideal for assembly floor operations.

It has hoists of two capacities, is capable of rapid lateral and longitudinal travel or the precise vertical movement so essential in assembling vital parts of valuable machines.

Basically of course, it is a Euclid Crane which assures dependable and efficient performance with low cost of operation and maintenance.

Available also are: Euclid Cranes, evolved through years of experience and specifically adapted to the peculiar needs of practically every industry. *Write for new catalog available.*

EUCLID
"RAISE PROFITS"

The EUCLID CRANE & HOIST Co.
1362 CHARDON ROAD
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ing through the gap between the two units, stops the feed conveyor so that the second unit will not feed into the car. As the first unit is loaded it hits a bar at the back of the car, tripping a limit switch which starts the downward travel of the car. As the car descends, the stop on the feed conveyor moves back into position and the car trips a limit switch which starts the feed conveyor again.

As an added precaution against double loading—which is very dangerous because the car will not hold two units without the second overhanging and being smashed on the downward travel—a photocell was added to the system.

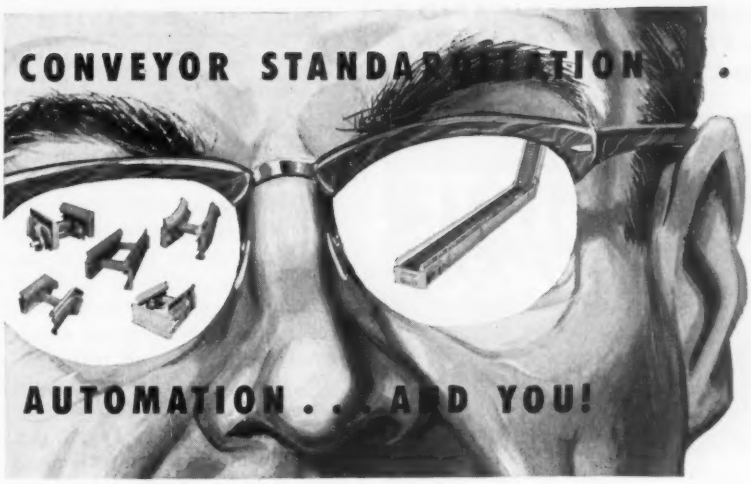
It is located so that the beam shines between the car and the feed conveyor. If the beam is broken when the switch that starts the car downward is tripped, the entire system is shut off and must be restarted at the control station.

High Vertical Speed

The car travels about 15 feet vertically at a speed of 100 feet per minute. This high speed is required because we want a maximum capacity of one TV set per minute. This means two trips per minute on console models, where the cabinet and carton are delivered separately.

A variable timer in the circuit permits the changing of this cycle so that one unit every three minutes can be delivered on the slowest automatic feed cycle. The controlled delay in the cycle occurs when the car reaches the bottom. Once the delay time has elapsed, the belt conveyor on the car starts up—in the opposite direction to which it traveled in loading upstairs—and discharges the cabinet onto a short feeder belt conveyor section, which, in turn, moves it onto the final assembly line.

The intermediate feeder conveyor is required because the cabinet assembly conveyor is slow-moving and the cabinet overhangs the feeder conveyor as it is being pulled onto the assembly conveyor. This is an entirely mechanical op-



Now you can buy CUSTOMIZED conveyors in pre-fabricated STANDARD sections

In a **single glance,** you can see all of the advantages of MAY-FRAN STANDARDIZED components.

The five standard sections shown can be assembled to form virtually any type of *"customized"* conveyor for the handling of stampings, formed metal parts, forgings, automotive scrap, chips and turnings.

Straight sections . . . concave or convex sections . . . take-up charge and discharge-end sections can be furnished to meet specific requirements of belt width as well as load bearing and volume capacities.

A **single glance** at the MAY-FRAN conveyor standardization program, and you will see savings never before possible. In addition you will see unsurpassed conveyor flexibility.

MAY-FRAN . . . a name long recognized in the materials handling field . . . is **FIRST** again with *standardized* components for your *customized* installation.

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ENGINEERING, INC.
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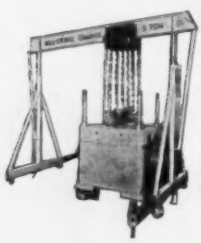
ALL-STATE Cranes
CUT HANDLING COST

Surveys show that material handling costs average 30% of total production cost. An ALL-STATE overhead crane will provide astonishing savings in both labor and time, enabling you to reduce these major production costs to a minimum.

JIB CRANES
Self-supporting, require no overhead support — ideal for outdoor crane service. Complete revolution possible for maximum coverage. Heavy duty Ball Bearings. Capacities from 250 lbs. to 12,000 lbs.

Single Girder Type, Top Running Crane, Hand Geared, Motor Driven, Push Type. Available also in underslung or double girder style. Capacity 1 to 10 tons — up to 60 foot span.



GANTRY CRANES
with adjustable girder height — telescoping outriggers — ball bearing swivel casters.

FREE
Complete information upon request.

ALL-STATE *Engineering Co.*, INC.
4425 West State St.
Milwaukee 8, Wis.

Circle No. 7 on Reader Service Card

SINGLE SUPPLY SYSTEM

Continued

eration, but the transfer time will vary with the position of the cabinet, etc. It would have introduced an unwanted and uncontrolled delay factor in the cycling of the lift had we attempted a direct transfer. The time that the car conveyor runs to discharge the unit is governed by a pre-set timing relay; after its cycle has elapsed, the car is sent back up.

To prevent damage if a unit gets partially off and then is jammed so that it won't clear, a safety cord attached to a limit switch is fixed across the opening. A partially discharged unit being carried back up by the car will hit it and thereby shut off the entire system.

In addition to the automatic cycle, each reciprocating lift is equipped with complete manual control so that any portion of the system can be manually operated both forward and reverse if it is desired. This provision was made so that cabinets could be delivered, as required, at a very low rate during breakin of a new model—and also so that cabinets could be sent back upstairs if it was required.

Wire Mesh Assembly Belt

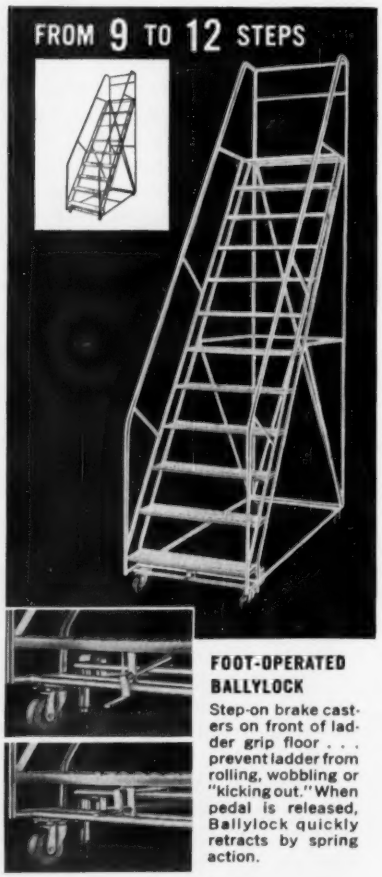
The cabinet assembly line is a belt conveyor 30 inches wide, with wire mesh belting on a 35-inch wide steel slider bed 283 feet long.

Sets requiring repair are shunted onto a "U"-shaped roller conveyor, by-passing the main line, and are repaired by operators working inside the "U".)

The set is packed, and the belt carries it through the fire wall, separating the manufacturing area from the warehouse.

The conveyor is mounted at a 22-inch height, but it is sloped down to floor level at the packing operation and continues at this level to the end. Openings in the wall are protected with gullotine fire doors. Each door is equipped with a photo-electrical cell and solonoid-operated cam system which will prevent the door from dropping should the fusible link be

WORK AT
HIGH LEVELS SAFELY...
ON BALLYMORE "Hi-boy" SAFETY-STEP LADDERS



FOOT-OPERATED BALLYLOCK
Step-on brake casters on front of ladder grip floor . . . prevent ladder from rolling, wobbling or "kicking out." When pedal is released, Ballylock quickly retracts by spring action.

Strong, safe, and easily moved about, Ballymore "Hi-boy" Step Ladders provide sure support at extra-high working levels—up to 15 feet!

All-welded steel construction . . . rust-resistant aluminum finish. Smooth-rolling casters provide complete mobility. Rugged step-on Ballylock extends front legs for firm, stable floor contact.

Four sizes, six models to choose from—each with sturdy handrails. Three types of non-slip tread construction.

Write today for complete specifications to Ballymore Company, Wayne 5, Pa.

BALLYMORE LADDERS
THE STANDARD BY WHICH SAFETY LADDERS ARE JUDGED

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SINGLE SUPPLY SYSTEM

Continued

parted when a set is passing through the opening.

Grab trucks are used to handle the sets in the warehouse—which has capacity for approximately 30,000 sets—and in the shipping operation. Shipping is by rail and trailer truck. We have an enclosed railroad spur which will accommodate three box cars. Truck shipping is also enclosed; there are eight truck ports, and each loading point is equipped with a hydraulic leveling ramp.

CREDITS:

***Belt and slat (test) conveyors** by Standard Conveyor Co.; hydraulic docks by Rotary Lift Co.; overhead conveyors, conveyorized storage racks, and pneumatic tubes by Lamson Corp.; reciprocating lifts and "ferris-wheel" conveyor by Hohl Industrial Sales; trucks by Baker-Raulang Co.; wire mesh belting by Ashworth Brothers, Inc.*

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TO WHOM MONEY MAY CONCERN:

If your production costs are higher than they ought to be, you very likely can do something about it. Often one change in a method or process can make the difference between loss and profit. We'd like a chance to consult with you and see if such a change in method won't improve *your* profit picture. (It certainly has paid off for many other firms). The best part is, that it won't cost you one cent to find out. Just clip the attached coupon and mail it. When you do, one of our trained conveyor belt representatives will visit you to discuss and examine your particular problem and offer suggestions that will show you how Cyclone Metal Processing Belts may cut your production costs below the ulcer level. These suggestions will be tailored to YOUR problem . . . and no obligation. How can you lose? Do it, today.

CYCLONE FENCE DEPARTMENT

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL CORPORATION, WAUKEGAN, ILLINOIS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

MAIL THIS COUPON

Cyclone Fence
Dept. A-16, Waukegan, Illinois

Please have your trained representative call on us to discuss our production problems.

Name .....

Company .....

Address .....

City ..... State .....

USS

UNITED STATES STEEL

THE CANTON REPOSITORY Page 1[illegible]

Canton Stoker Buys Wagener Steam Pump

69-Year-Old Firm Will Be Operated as Division of Purchaser

Canton Stoker Corp. has purchased the assets of the Wagener Steam Pump Co. of 1101-8th st SW, which has been a manufacturer of piston type steam and power pumps for 69 years.

Wagener pumps are designed to operate either with high pressure steam or electric motor drives. They are used for a wide variety of purposes.

Some are used to pump shampoos, detergents, soap, tooth paste, fuel oil, water, mashed potatoes and chemicals from one point to another.

To Be Major Supplier

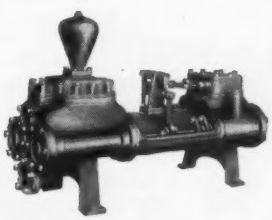
Dubs said the addition of the Wagener Steam Pump division will establish Canton Stoker as one of the major suppliers of boiler room equipment in this country.

Canton Stoker produces a com-

to be known as . . .

Wagener-Schrader **Pump Div.**

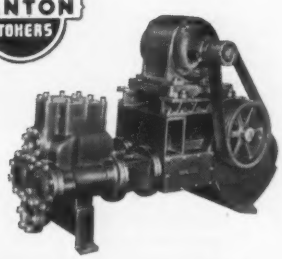
CANTON STOKER CORP.



"Wagener" STEAM PUMPS

"THE *RIGHT* PUMP TO DO THE JOB *BEST*"

CANTON STOKERS



"Schrader" POWER PUMPS

CANTON STOKER CORPORATION

Specialists in Automatic Coal FIRING, HANDLING and CONTROL Equipment
108 ANDREW PLACE S. W. • CANTON, OHIO • PHONE GLendale 3-9133

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in useful literature

These publications, written by experts, are available. Indicate your choice on the self-mailing Readers Service Card.

Power Shovel:

Illustrations and specifications on the new Unit Challenger Model 510 are contained in a 12 page bulletin available from Unit Crane & Shovel Corporation. Such features as hydraulic actuated clutch control, full floating trunion mounted taper drums and self-aligning hook shoes are described in detail.

Circle 200 on Reader Service Card

Planning and Executing A Big Lift:

How a 90-foot, 360-ton deresining tower was raised in the midst of an operating refinery, while operations were dovetailed with a tight downtime schedule, is the subject of a brochure published by The M. W. Kellogg Company.

Circle 201 on Reader Service Card

Floor Trucks:

Junior catalog 56G offered by Nutting Truck and Caster Company illustrates 49 different models of two wheel and platform trucks, 12 types of dollies and 15 styles of casters.

Circle 202 on Reader Service Card

Plastic Covered Steel Tape:

Technical data sheet from The Garrison Company covers plastic-jacketed steel strap that does not chafe or corrode, stretch or sweat. Various uses of the Met-L-Tape are described, in addition to physical properties.

Circle 203 on Reader Service Card

For Narrow Aisles:

Bulletin published by The Raymond Corporation describes a 4000 pound capacity, electric tiering, straddle truck that operates in narrow aisles.

Circle 204 on Reader Service Card

Conveyors Reduce Costs:

Standard Conveyor Company tells in bulletin 88 how conveyors are reducing handling costs in food stores, warehouses and chain stores.

Circle 205 on Reader Service Card

Industrial Engines:

The Le Roi Division of Westinghouse Air Brake Company has published an eight page bulletin describing its H540 and H844 V-8 engines. Drawings, charts and diagrams illustrate the advance design, performance and economy of the engines which operate on gasoline, natural gas, or LP-gas.

Circle 206 on Reader Service Card

Tape Uses:

Numerous applications of pressure sensitive tapes are included in a brochure prepared by Behr-Manning, Division of Norton Company. Tips on determining tape quality and how to specify the proper tape for the job are also detailed in the literature.

Circle 207 on Reader Service Card

Extra Safe Slings:

Dura-grip wire rope slings are featured in a new bulletin prepared by the Wickwire Spencer Steel Division of The Colorado Fuel & Iron Corporation. The special hand splice construction is said to guarantee long life and extra safety.

Circle 208 on Reader Service Card

Caster Selection Guide:

A handy reference file of caster information suitable for a desk drawer or wall may be obtained from Faultless Caster Corporation. The folder illustrates and describes casters by load rating, wheel size, etc., and serve as a selection guide.

Circle 209 on Reader Service Card

Faster, Easier Shipping:

A practical step-by-step guide to shipping corrugated box products faster and easier is offered by Signode Steel Strapping Company. Diagrams illustrate carloading methods.

Circle 210 on Reader Service Card

Engines in the Desert:

Recent issue of Enginews, publication of Wisconsin Motor Corporation, tells how Wisconsin engines are successfully operating in the high of the desert in Saudi Arabia.

Circle 211 on Reader Service Card

Diesel Powered Crawler Tractor:

Allis-Chalmers Manufacturing Company tells the technical and operating story of the HD-6 Diesel-powered crawler tractor in catalog MS-461. Engineering, design and performance features are explained in the publication.

Circle 212 on Reader Service Card

Casters and Wheels:

Catalog 155 offered by The Phoneix Caster Company contains 28 loose-leaf pages of information on casters and wheels in many sizes and types.

Circle 213 on Reader Service Card

Mobile Power:

An eight page brochure offered by Star-Kimble Motor Division of Miehle Printing Press & Mfg. Co. describes its new mobile A.C. power unit, Mo-Bil-Ac. Technical data and application details are contained in the booklet.

Circle 214 on Reader Service Card

Pumps and Motors:

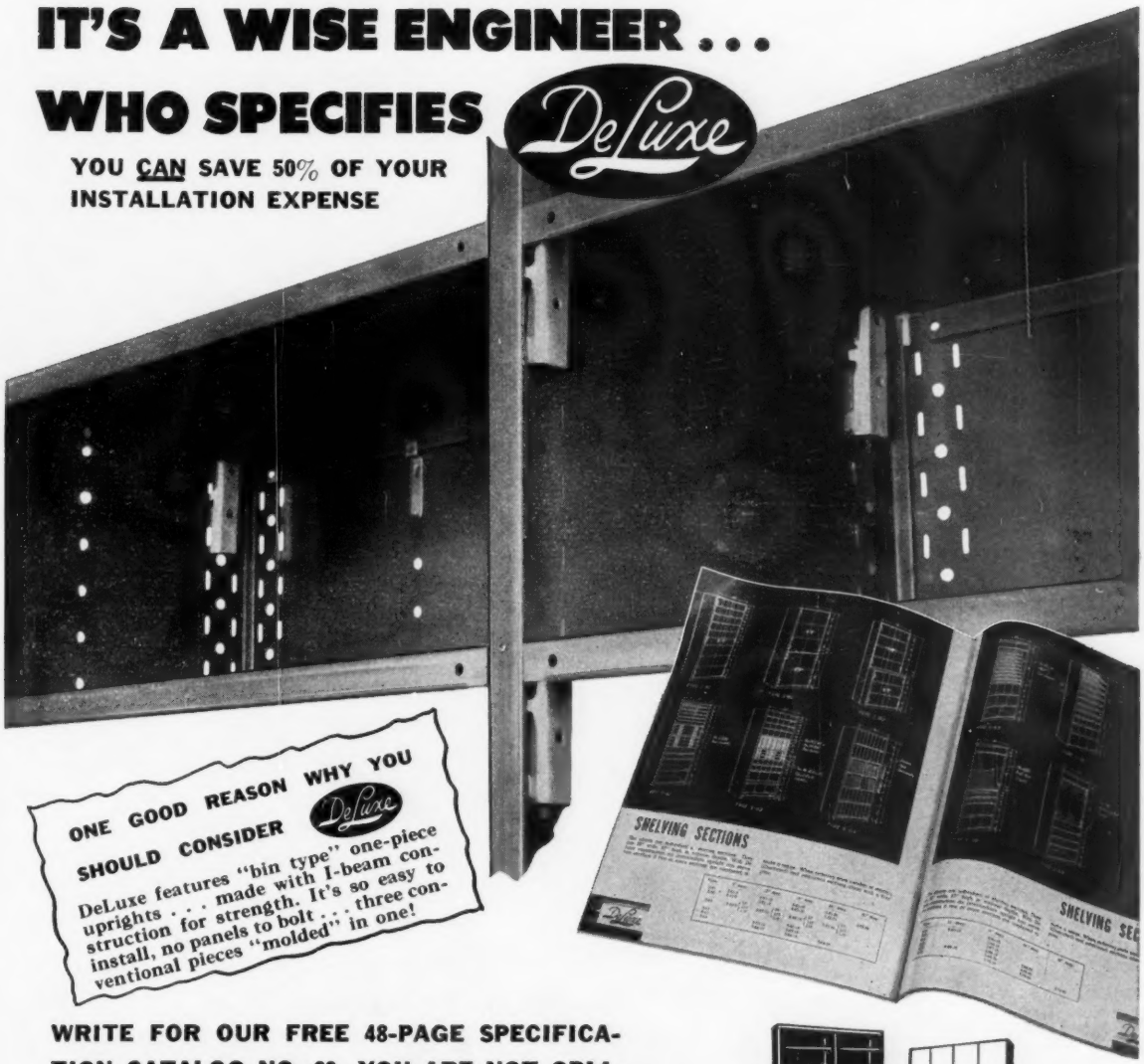
Products from The New York Air Brake Company are detailed in a 16 page brochure that covers vacuum and liquid pumps, air brake equipment and hydraulic motors.

Circle 215 on Reader Service Card

IT'S A WISE ENGINEER . . .

WHO SPECIFIES DeLuxe

YOU CAN SAVE 50% OF YOUR INSTALLATION EXPENSE



ONE GOOD REASON WHY YOU SHOULD CONSIDER DeLuxe

DeLuxe features "bin type" one-piece uprights . . . made with I-beam construction for strength. It's so easy to install, no panels to bolt . . . three conventional pieces "molded" in one!

WRITE FOR OUR FREE 48-PAGE SPECIFICATION CATALOG NO. 29. YOU ARE NOT OBLIGATED WHEN YOU USE OUR "PLANT LAYOUT SERVICE." THERE IS A DeLuxe FACTORY TRAINED REPRESENTATIVE AS NEAR TO YOU AS YOUR TELEPHONE.

It's wise to specify DeLuxe Careful selection of shelving now . . . will save you set-up headaches and extra expense later. DeLuxe shelving is fully finished . . . no rough edges . . . our special components make it possible to assemble in half the time . . . heavy gauge materials are used throughout . . . it's versatile . . . for any plant requirement. When you spell out "DeLuxe" on your proposed plant layout . . . you've protected your shelving investment for all time.

DELUXE METAL FURNITURE COMPANY

40 Struthers Street, Warren, Pa.

A DIVISION OF THE ROYAL METAL MFG. CO.

Manufacturers of "Verti-File", "Templa-File", and quality factory furniture.

Circle No. 58 on Reader Service Card for more information

USEFUL LITERATURE

Continued

Need An Engineer?

"A Guide for Selecting an Engineering Firm" is the title of a booklet published by The Teller Company and prepared especially for top management.

Circle 216 on Reader Service Card

Mechanized Lumber Handling:

A 16mm sound film in color is available from Baker-Raulang Company. It demonstrates the use of a side-loading fork truck in handling lumber, and shows how the truck can stack and unstack lumber, handle long loads in narrow aisles, and deliver through city streets.

Circle 217 on Reader Service Card

Conveyors Keep Pace:

How a conveying system was expanded to keep pace with increased production of finished talc when plant capacity was almost doubled is explained in a technical article available from the Fuller Company, subsidiary of General American Transportation Corporation.

Circle 218 on Reader Service Card

Plastics Reference File:

Technical data about the wide range of special and general-purpose plastics and resins is presented in a revised catalog prepared by Bakelite Company, Div. Union Carbide and Carbon Corp.

Circle 219 on Reader Service Card

Factors in Truck Selection:

Major factors to be considered when specifying an industrial truck are detailed in a four-page folder offered by The Elwell-Parker Electric Co. Included in the literature is a convenient table which lists 22 points that should be used for evaluating the type of truck most suited to a given operation.

Circle 220 on Reader Service Card

How To Modernize Cranes:

Bulletin CE-400 from Ederer Engineering Company tells how to modernize existing cranes for more efficient, economical handling.

Circle 221 on Reader Service Card

Electric Motors:

Howell Electric Motors Company tells why its series 100 motors are smaller, lighter and cooler running, in a 16 page colorful catalog.

Circle 222 on Reader Service Card

Instant Reference:

You can have reference to as many as 1,000,000 characters of business data with the Univac File-Computer, says literature from Remington Rand Division, Sperry Rand Corporation.

Circle 223 on Reader Service Card

Which Machine?

If you're bothered about which machine to use for a specific job, literature from Caterpillar Tractor Company contains ideas on the subject. Actual customer jobs are discussed.

Circle 224 on Reader Service Card

High Lift Walkie:

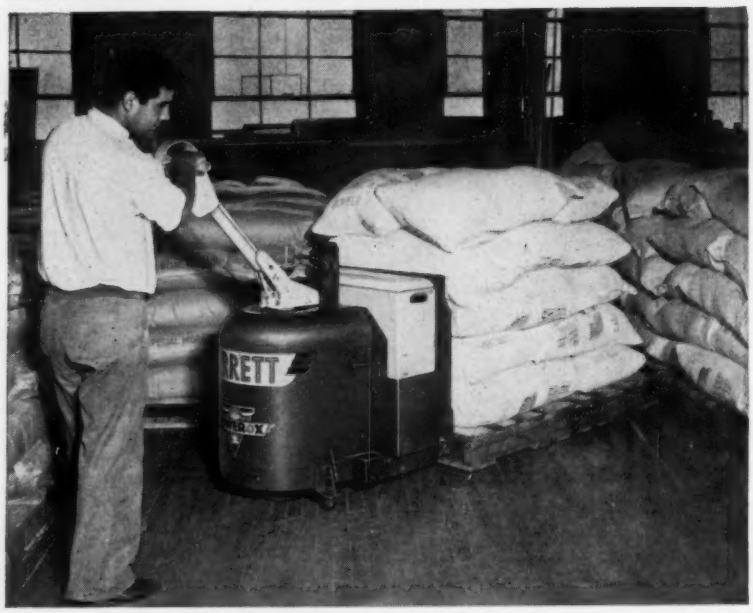
An electric high lift walkie is detailed in bulletin 551-3 available from Barrett-Cravens Company. The unit is specifically designed to speed the moving and stacking of any type load that can be carried on a platform.

Circle 225 on Reader Service Card

Sling Wall Chart:

American Chain & Cable Company's Wire Rope Sling Department has available a wall chart on wire rope slings designed to be displayed in a prominent place. It lists diameters and lifting capacities of Strand-Laid slings.

Circle 226 on Reader Service Card



Barrett PalletOx Model PX 4" lift cap. 4000 up to 6000 lb.

BARRETT PALLETOX

the low-cost "walk away" for loads up to 6,000 lb.

Barrett PalletOx walking type power lift truck is a money-saver on short hauls...load spotting... general pallet handling. Often eliminates expense of rider type power truck operation. PalletOx is made for fast operation—gets into tight corners—short turning radius—no lost-time gaps to slow down handling. 4" lift prevents floor snagging. Write for complete descriptive literature.

Hydraulic hand-lift models also available for loads up to 60" long. Capacities—2,500 and 6,000 lb., 4" lift. Release treadle to lower. Write for Bulletin.

You will want Catalogs 551-1-2-3 on the complete Barrett "Walkie" type Power Truck. Your request will bring a copy.

BARRETT-CRAVENS COMPANY
614 Dundee Road, Northbrook, Illinois

Representatives in All Principal Cities
Canadian Licensee: S. A. Armstrong, Ltd., Toronto, Canada

Barrett Handling Equipment

BARRETT

ONE MAN DOES MORE THAN 3 OR 4...WITH A BARRETT

Circle No. 25 on Reader Service Card for more information

Industrial Truck Batteries:

How industrial batteries are teaming with trucks to bring about maximum efficiency in material handling is outlined in a series of articles offered in the latest issue of "Storage Battery Power", publication of the Edison Storage Battery Division, Thomas A. Edison, Incorporated.

Circle 227 on Reader Service Card

How Magnets Saved:

Case history bulletin from Houdaille-Hershey of Indiana, Inc. tells how one company saved $2300 in one year after installing magnetic separators.

Circle 228 on Reader Service Card

Application Analysis Report:

An application analysis report which pictures and describes 21 of the numerous ways in which standard Warner units can be applied to power transmission drives may be obtained from Warner Electric Brake & Clutch Company.

Circle 229 on Reader Service Card

Hydraulic Docks:

Four page brochure prepared by The Wayne Pump Company covers hydraulic docks, bridges and ramps and points out advantages of the units.

Circle 230 on Reader Service Card

Stock Room on Wheels:

Wenthe-Davidson Engineering Company, Inc. offers literature on its industrial trucks which it calls stock rooms on wheels.

Circle 231 on Reader Service Card

For Maintenance Men:

Folder available from Clark Equipment Company describes the Powrworker 26 pallet truck, said to be the most serviceable of its type on the market. The literature compares features with three comparable makes.

Circle 232 on Reader Service Card

Test Operations Report:

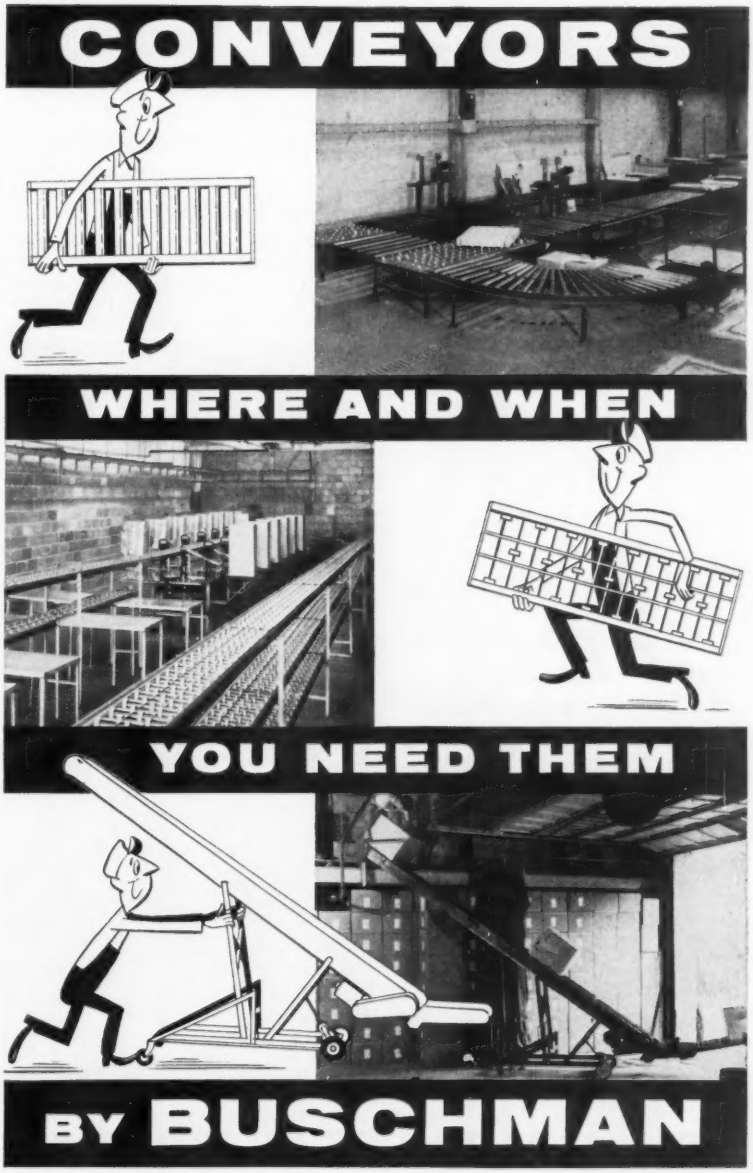
Bulletin T-114 offered by Whiting Corporation pictures and describes the history and development of the heavy-duty Trackmobile.

Circle 233 on Reader Service Card

Conveying of Sulphur:

How conveyors are working in Mexico to move sulphur for ultimate use by nations of the Free World is only one of the interesting stories told by The S-A Conveyor, publication of Stephens-Adamson Mfg. Co. Others concern zipper and rooftop conveyors.

Circle 234 on Reader Service Card



Exclusive design features make Buschman portable conveyors . . . wheel, roller and powered belt . . . quickest and easiest to move and put into operation. Durably constructed to withstand the roughest usage, these versatile conveyors have an unlimited range of application in production, warehousing, packing, shipping and receiving operations.

Pre-engineered standard components are combined into a conveyor system custom-tailored to your particular job. Then, whenever requirements change . . . wherever a new need arises . . . your system can be rearranged or relocated in minimum time . . . at minimum expense.

Buschman portable conveyors are stocked at the factory and by leading distributors across the country. We'll gladly assist in surveying your plant to develop ideas which will cut costs, boost profits.

Write today for catalog and name of nearest representative.

PRODUCE MORE...FOR LESS Buschman Conveyors C-221-EWB

THE E. W. BUSCHMAN COMPANY
4450 Clifton Avenue • Cincinnati 32, Ohio

CONVEYOR SYSTEMS FOR ALL INDUSTRIES
ENGINEERED • MANUFACTURED • INSTALLED

Circle No. 33 on Reader Service Card for more information

USEFUL LITERATURE

Continued

Control Transformers:

A 32 page catalog by General Electric Company describes the complete line of G-E control transformers. It contains ratings, dimensions, product features and model numbers.

Circle 235 on Reader Service Card

Two-Way Radio:

Publication of Motorola Inc., Communications and Electronics Division, cites numerous examples of two-way radio at work in a variety of businesses. How radio is working to cut costs, speed production and save lives is explained in the literature.

Circle 236 on Reader Service Card

What Is Electronics?

If you're interested in learning more about electronics, Otis Elevator Company carries an interesting explanation on the subject in a copy of the Otis Bulletin. Other elevator news and human interest stories are also contained in the publication.

Circle 237 on Reader Service Card

Assembling Worm Gears:

Bulletin CA-55 by Cone-Drive Gears, Div. Michigan Tool Co., contains complete engineering details on the assembly procedure for Cone-Drive double-enveloping worm gearing.

Circle 238 on Reader Service Card

Protects Equipment:

Engine hour meters serve as protection for powered equipment, according to literature from John W. Hobbs Corporation which outlines the various types of meters available.

Circle 239 on Reader Service Card

Difficult Handling Problem?

Latest issue of Towmotor Corporation's "Handling Materials Illustrated" contains a series of case histories which show how various companies have solved difficult handling problems.

Circle 240 on Reader Service Card

Automatic Parts Handling:

Bulletin MC-250 published by The Homer Manufacturing Company suggests new possibilities for completely automatic handling of ferrous parts.

Circle 241 on Reader Service Card

Auger Filling:

Four basic methods of auger filling are described and illustrated in a folder featuring Stokes & Smith Company's Universal auger filler.

Circle 242 on Reader Service Card

Remote Metering and Control:

How Chronoflo Telemeters bring accurate records and control over an unlimited distance to the fingertips of plant and industry operators is told in literature available from Builders-Providence, Inc., Div., B-I-F Industries, Inc.

Circle 243 on Reader Service Card

Hard-To-Pack Products:

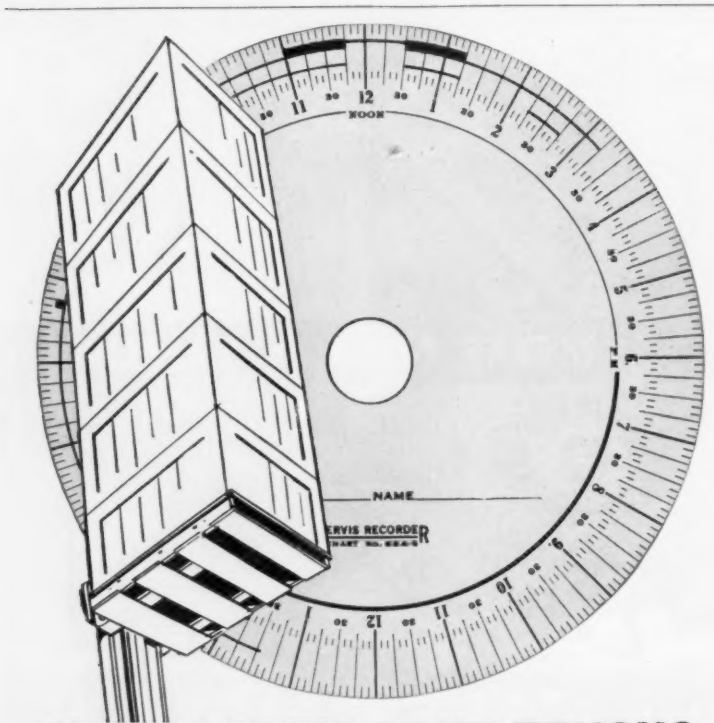
General Box Company has available a 12 page brochure which features wirebound box designs developed for hard-to-pack products. Descriptions are given on the packing of revolving steel doors and hi-voltage disconnect switches, among other items.

Circle 244 on Reader Service Card

Coupling Catalog:

Flexible, gear-type mechanical couplings are described in a 12-page catalog available from Philadelphia Gear Works. Specifications are listed, together with information on selection, installation, service and lubrication.

Circle 245 on Reader Service Card



OVERLOADING YOUR TRUCKS ISN'T THE ANSWER . . .

Equipped with Servis Recorders, your fork, high-lift, and platform trucks, conveyors, and other materials handling units, can be operated at peak efficiency—every working minute.

The Servis Recorder is an accurate instrument, easily installed, which records standing and moving time on a specially processed chart. Just bolt it on—no connection with any moving part. It will tell when your truck is BUSY . . . when it is IDLE . . . when it is LIFTING . . . when the engine is RUNNING. Also, when to OVERHAUL! For stationary equipment, Model M Electrical Servis Recorders chart productivity.

Write for information on Servis Recorders that help large manufacturing plants operate successfully. Ask for Bulletin I.T. The Service Recorder Co., 1375D, Euclid Avenue, Cleveland 15, Ohio.

Tells Every Move Your Truck Makes

The Servis Recorder

Circle No. 162 on Reader Service Card for more information

Bulk Material Handling At Less Cost:

Catalog DC-855 published by Beaumont Birch Company features Dura-Tred chains and Beaumont drive wheels for bucket elevators and conveyors. The manufacturer claims its products will handle bulk material at less cost per ton than conventional design chains.
Write 246 on Reader Service Card

Conveyor Belt Carriers:

Stephens-Adamson Company's bulletin 355 covers conveyor belt carriers. Newest addition to the line is a long center roll carrier with either 35 or 45 degree slope end rolls for greater carrying capacity on light materials such as grain and wood chips.
Write 247 on Reader Service Card

Overhead Conveyor Advantages:

Advantages, applications and specifications of overhead Cable-Way trolley conveyors are detailed in a 12 page catalog by Tipp Manufacturing Company. Photos and engineering drawings of a conveyor system are shown.
Write 248 on Reader Service Card

Flexible Bins:

Folder prepared by Sturdi-Bilt Steel Products, Inc. features bulk bins with a floating wedge lock. The bins, which can be erected without special tools, bolts, nuts, cross bracing or welding, are versatile, flexible and economical.
Write 249 on Reader Service Card

Light Overhead Conveyor:

Outstanding features of its new light overhead conveyor are pointed out in literature by Triangle Equipment Company, Inc. The entire system is said to be easily installed and maintained.
Write 250 on Reader Service Card

Caster News:

Latest issue of the Forecaster, publication of Darnell Corp., Ltd., explains the exacting measures used by the manufacturer to insure the highest quality casters. It also tells how the casters are being used by various firms which have standardized on Darnell.
Write 251 on Reader Service Card

A Crane's Value:

Why the E type of overhead traveling crane is particularly valuable in industries where cranes are used intermittently or where high-speed lifting and travel are not essential is explained in literature offered by Whiting Corp.
Write 252 on Reader Service Card

Hose Couplings:

Titeflex, Inc. has issued a revised catalog on its Quick-Seal line of quick connect-disconnect hose couplings. Construction details are outlined on the units that are said to give tighter seals with higher pressure.
Write 253 on Reader Service Card

Air Operated Palletizer:

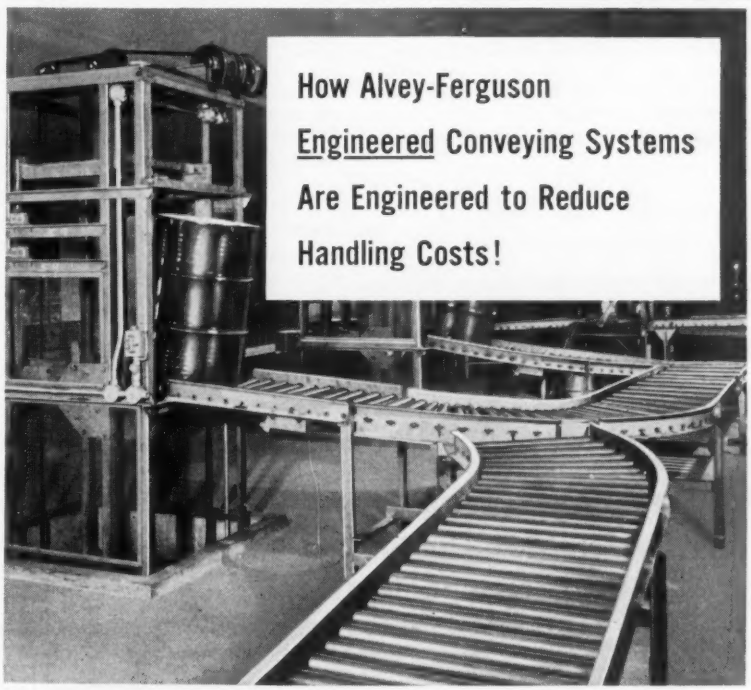
Literature from Alvey Conveyor Manufacturing Company tells how an air operated palletizer handles bags, bales, cartons and blocks, stacking them in uniform patterns.
Write 254 on Reader Service Card

Solves Heavy Moving Problems:

Every business with heavy moving problems can save money, time and inconvenience with the Mighty Mover, says literature from Acorn Company. Each unit has a load guarantee of 45,000 pounds.
Write 255 on Reader Service Card

Package Testing Booklet:

No. 11 in Hinde & Dauch's Little Packaging Library series contains valuable information on how to test merchandise in corrugated boxes. The 24 page booklet offers a check list for



As industry moves more and more to automation, leading manufacturers depend more and more on A-F *Engineered* Conveying Systems to make the *one* kind of savings now possible—*operational* savings! So, let's face facts . . . Certainly, you may be able to buy *lengths* of various types of conveyors at low prices—but only a *complete plant-wide conveying system* engineered by A-F *assures* you of the efficient operation you need for *appreciable* operational savings in the handling of your parts, products and packages from receiving to shipping dock . . . Now is the time to discuss your products-handling and package-handling with the company that *founded* the package-conveyor business in 1901 . . . Perhaps it will pay you to even *scrap* the conveyors you now have—for an A-F *Engineered* and *fully automatic* system . . . Write us—without obligation—today.

Write for our Bulletin of Engineered Conveying Systems today

YOU CAN SEE THE SUPERIORITY OF A-F CONVEYOR ENGINEERING

A-F

A-F *ENGINEERED* CONVEYING SYSTEMS

Also Pre-Engineered Conveyors
Wheel, Roller, Belt, Trolley

THE ALVEY-FERGUSON CO., 433 Disney St., CINCINNATI 9, OHIO and Azusa, California

Circle No. 6 on Reader Service Card for more information

judging the protective qualities and general efficiency of specific corrugated boxes.

Circle 256 on Reader Service Card

Centralized Lubrication:

Data on how to modernize machines with centralized lubrication is available from The Farval Corporation. The system is said to pay for itself in savings in labor, lubricant, bearing expense and production time.

Circle 257 on Reader Service Card

Special Hand Truck:

Brochure from U. S. Products, Inc. outlines the new USP RL-10 hand truck designed specifically for handling gypsum lath. The truck is said to have saved many times its cost in time and increased efficiency.

Circle 258 on Reader Service Card

Automatic Dockboards:

Kelley Company, Inc. offers bulletin D-153 on the Hi-Lo automatic dockboard. The literature illustrates and describes the low cost features of the unit which utilizes the backing truck as its only source of power.

Circle 259 on Reader Service Card

Stencil Cutting Problem?

Literature from Ideal Stencil Machine Co. says that only its automatic carriage assures absolute parallel lines and positive character and word spacing for stencil cutting.

Circle 260 on Reader Service Card

Hydraulic Pumps:

The New York Air Brake Company offers an illustrated bulletin describing its new series PFM-100 dual vane hydraulic pumps, designed expressly for mobile equipment.

Circle 261 on Reader Service Card

Engineering Psychology:

The Franklin Institute Laboratories has published the first of a series of brochure describing specialized technical services offered to industry by the Institute.

Circle 262 on Reader Service Card

Magnets for Metal:

Permanent magnetic equipment designed for use in steel and metalworking applications is described in a fold-out brochure available from Eriez Manufacturing Company.

Circle 263 on Reader Service Card

Lightest Weight:

Brooks & Perkins Incorporated tells in its publication "Magnesium" how to design for lightest weight. It covers general design principles with magnesium and suggested design factors.

Circle 264 on Reader Service Card

Engine Meters:

Folder from John W. Hobbs Corporation says you can prevent major repair with timely care provided by Hobbs engine hour meters.

Circle 265 on Reader Service Card

Centralized Lubrication:

Bulletin 26-R from The Farval Corporation says that few, if any, small investments in industrial plant equipment will pay a quicker or greater return than the purchase of its centralized system of lubrication.

Circle 266 on Reader Service Card

Plastic Coatings:

Polyvinyl chloride plastisols that provide chemical resistance and cushioning protection in tote systems, baskets, lifting devices, etc. are described in literature offered by Quelcor, Incorporated.

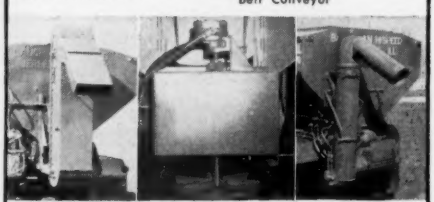
Circle 267 on Reader Service Card

it's the New BULKMOBILE

WITH THE SELF-SUPPORTING BULK BODY
THAT NEEDS NO TRAILER FRAME

5 METHODS of DISCHARGE

Belt Conveyor


Belt & Bucket | Distributor | Screw Conveyor

Also by CENTRIFUGAL STACKER

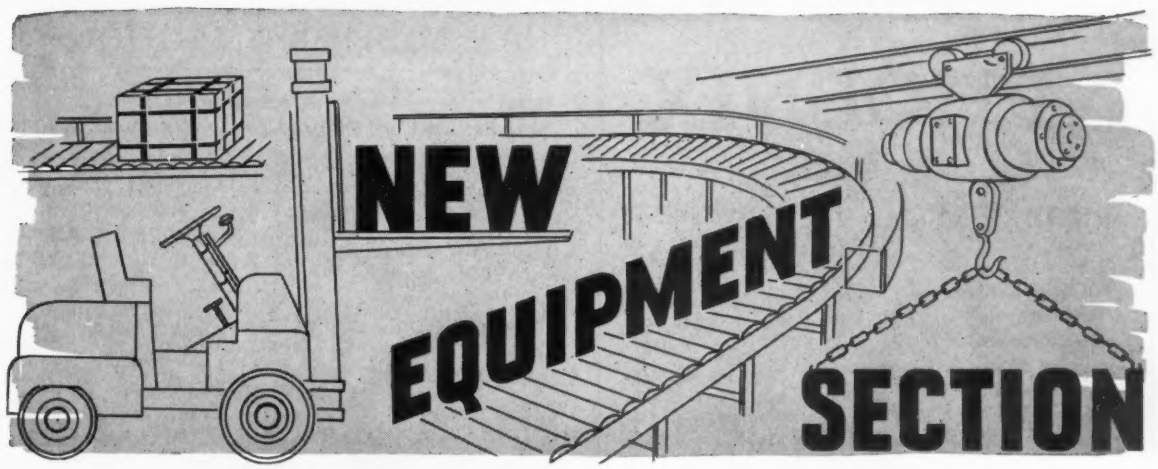
Designed to Carry the BIG Loads . . . at BIG Savings

- All-Hydraulic Operation or Gasoline Engine
- Rapid Discharge
- Compartmented Interior
- Self-Supporting Body
- Roomy Hatches
- BIG Capacity
- With or without Roof

WRITE for new BULKMOBILE Bulletin A-399

BAUGHMAN
BAUGHMAN MANUFACTURING CO., Inc.
106 Arch Street • Jerseyville, Ill.

Circle No. 26 on Reader Service Card for more information



Engine Life Doubled

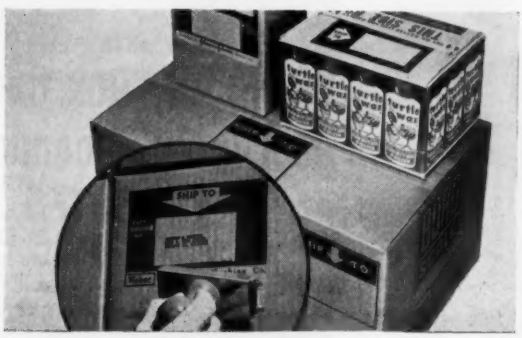
Automatic Transportation Company is featuring an LP-gas engine on this gas-electric Dynamotive fork truck which is said to have doubled engine life due to the economical operation of LP gas. Capacities of 4000- to 10,000-pounds are available.

Circle 270 for more information

Extremely Maneuverable

Front end loader with front wheel drive and rear wheel steering was recently introduced by Napco Construction Equipment, division of Napco, Inc. Designed for handling all bulk materials, it features extreme maneuverability and exceptionally high lifting.

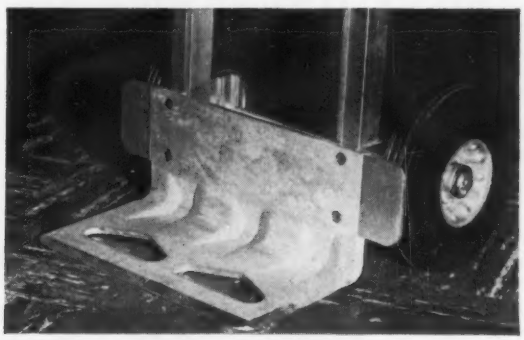
Circle 271 for more information



Shipment Addressing System

The Weber Lable-Frame System of Weber Addressing Machine Co. assures that all cartons in a multiple shipment will be addressed in the same place. "Ship-to" frames are printed on the cartons by the carton maker. Imprint with Weber printer and stencil.

Circle 272 for more information



Non-Breakable Nose Plate

Brooks and Perkins, Inc.'s newest line of 350- to 450-pound capacity two-wheel hand trucks features a forged magnesium nose plate that will not break, protective wheel guards, and a new axle bracket design which permits changing from six- to eight-inch wheels.

Circle 273 for more information

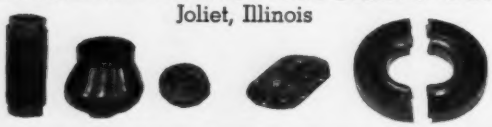
Circle 143 on Reader Service Card for more information

it's PHOENIX
for
RUBBER MOLDING

We offer skilled craftsmanship—strict quality control and an unusual ability to maintain the closest of tolerances.

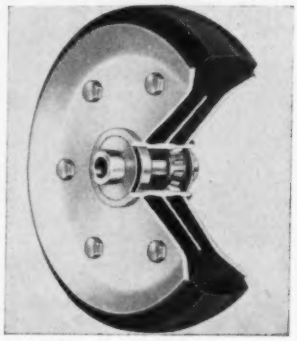
we respect our customers' confidences to the letter.

Address all inquiries to:
RUBBER PRODUCTS DIVISION
PHOENIX MANUFACTURING CO.
Joliet, Illinois



NEW EQUIPMENT SECTION

Self-Energizing Wheel



A wheel claimed to be completely new in design and concept is available from Roll Rite Corporation. Called the Self-Energizing wheel, it utilizes a molded rubber tread bonded vertically between two steel discs. By compressing the discs a displaced and inflated tread is produced that supports extremely heavy loads and permits the wheel to roll and swivel easily. Vertical bonding of the rubber is said to produce a tread that will not break loose.

Circle 274 for more information

Level Controller

A new level controller that combines what are said to be the greatest practical advantages of both electronic and air pressure control instruments has been developed by Fielden Instrument Division, Robertshaw-Fulton Controls Company. Called Pneutronic

USE THE
POWER TRUCK ATTACHMENT
LIFT-O-MATIC
for
HANDLING DRUMS
with a
POWER
FORK TRUCK
WITH FORKS LEFT ON
OR
REMOVED

Simple, automatic, mechanical handling of any size or type of drum—single or multiple.

WRITE FOR CATALOG
MARVEL INDUSTRIES, Inc.
2226 CLEVELAND ST., EVANSTON, ILLINOIS

Circle No. 131 on Reader Service Card for more information

NOLAN ONE-MAN CAR DOOR OPENER

Opens Any Box Car Door in 20 Seconds or Less! $37.50 EACH

FREE LITERATURE
F.O.B. NOLAN CO., BOWERSTON, OHIO

THE NOLAN COMPANY
110 Pennsylvania Street, Bowerston, Ohio
Please send ☐ ONE MAN CAR DOOR OPENER at $37.50
☐ FREE LITERATURE

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Circle No. 134 on Reader Service Card

level control, the device detects minute changes in levels in tanks, drums, etc. and converts electronic signals into proportional pneumatic output. This modulating air output is claimed to be sufficiently powerful to operate control valves and other pneumatic controls.

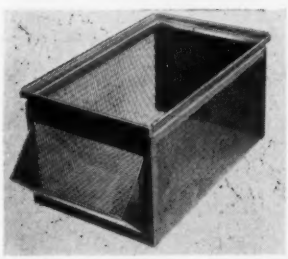
Circle 275 for more information

Mobile Tray-Drying Rack

This lightweight rack was designed by Crescent Metal Products, Inc., to solve sanitary tray-handling problems. After washing, trays or pans are inserted vertically in the rack, which can be rolled away for drying or storing, and then moved again to where the trays or pans are to be used. Standard racks are available to handle four different size trays or pans, and other sizes can be built to order. They are constructed of aluminum, reinforced tubing (sealed at both ends) with a choice of corugated or angle-ledge shelving.

Circle 276 for more information

Small Parts Container Fills Many Needs



Expanded metal basket containers have been added to the RANtote line of all-steel containers manufactured by Randolph Industrial Equipment Company. The new units are said to fulfill the requirements of all dipping and degreasing operations, in addition to serving as a storage or transporting container for all small parts. Advantages pointed out include less weight, lower cost and greater visibility. Four sizes are presently available.

Circle 277 for more information

All-Purpose Feed Body

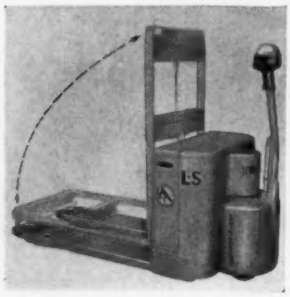
An all-purpose bulk-and-bag feed body featuring front-end discharge has been introduced by Baughman Mfg. Co. It is said to offer better weight distribution and provide better visibility. The body interior is of unobstructed design to permit maximum load in minimum space. Called the Du-All, the unt is available in body lengths of eight-, 10-, 12- and 14-feet.

Circle 278 for more information

Circle 22 on Reader Service Card for more information

NEW EQUIPMENT SECTION

Handles Pallets or Skids



Lewis-Shepard Products, Inc. is offering a hinged superframe on the new short-coupled Jacklift-electric pallet truck to enable the unit to handle skids as well as pallets. The superframe is locked in the up position when handling pallets and for skids is used in the down position. It can handle single or double face pallets and skids of any underclearance with loads up to 6000 pounds.

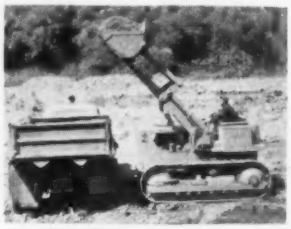
Circle 279 for more information

Storage Needs Vary? Here's Simple Solution

Bulk bins that are claimed to have greater rigidity with greater loads are offered by Sturdi-Bilt Steel Products, Inc. Designed primarily for the hand storage of goods, the bins permit creation of storage facilities as daily needs dictate, as there is no special labor required for set-up, expansion, disassembly or relocation at any time. Additional sections are easily added and intermediate shelves are designed for simple respacing as inventory requirements change. The patented Floating Wedge Lock Construction is said to be the key to the Bulk Bin's efficiency.

Circle 280 for more information

Operator Comforts Built-In



Recently introduced by Allis-Chalmers Manufacturing Company was this HD-6G tractor-shovel with a rated capacity of 1-1/3 cubic yards. Ease of operation, visibility and many operator comforts have been built into the unit. Power is supplied by the company's new HD-344 Diesel engine developing 57 net flywheel hp, 55 hp at the belt and 45 hp at drawbar. Among features are six truck wheels per side; two position bucket; new type shovel hydraulic system with triple filter protection; and semi-grouser track shoes.

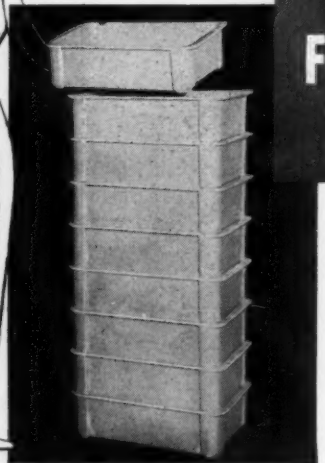
Circle 281 for more information

Tamper-Proof Storage Cabinets

Dust-free, tamper-proof storage through use of its steel cabinets is assured by the Standard Pressed Steel

MOVE or STORE SMALL PARTS

IN THE NEW FIBERGLASS TOTE BOX



* light but strong to carry greater payloads
* last indefinitely without maintenance
* tare weight is uniform . . . and they *lock stack*
* no sharp edges or corners. accident-free handling
* TOTELINE tote boxes are available in color for easy identification.

TOTELINE

Write for Bulletin 435

MOLDED FIBERGLASS TRAY CO.

LINESVILLE • PENNSYLVANIA

World's largest producers of fiberglass-reinforced resin trays and tote boxes

Circle No. 126 on Reader Service Card for more information

Safe DRUM Handling

Easy to install on any standard lift truck.

LIFTS
TRANSPORTS
STACKS

TRAY-HART. DRUM CARRIER

- Alignment compensator automatically places drums into gripping position.
- Carrier loads over drums.
- Gravity action causes gripping shoes to securely hold load.
- Release can only be effected by application of hydraulic pressure.
- Standard models handle standard 55-gallon drums in diameters from 22¼" to 24¾", and permit 6" variation in height in same load.
- Special types available for Monorail, Crane, and other applications.

TRAY-HART. CYLINDER CARRIERS

- All sizes and types of cylinders handled with ease.
- Quantity according to lift truck capacity.
- Write for complete information

Manufactured by

WALZ & KRENZER, Inc.

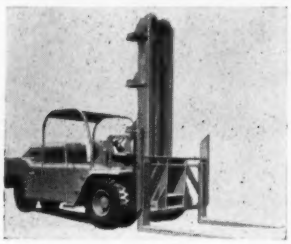
22 Flint Street, Rochester 8, N.Y.

Circle No. 188 on Reader Service Card

Co. The cabinets, adaptable to a wide variety of storage needs, have adjustable shelves which can be placed as close as 4 inches apart to allow installation of as many as 16 shelves in the standard 6½-foot cabinet.

Circle 282 for more information

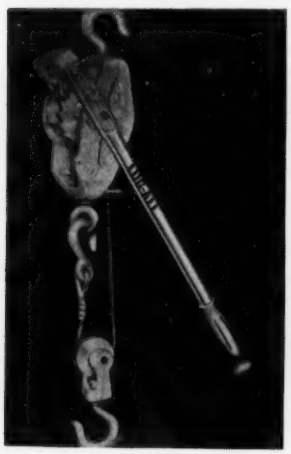
Giant Trucks Offer Important Economies



Newest addition to Gerlinger Carrier Company's line of fork trucks is the "H" series, available in capacities of 32,000-, 36,000- and 40,000-pounds. In straight lumber operations, a full kiln load, too unwieldy for single-load handling with other equipment, is possible in every "H" payload, claims the manufacturer. Important economies are also promised for steel, concrete pipe and other products that handle more profitably in oversize loads. The giant size trucks are said to be extremely maneuverable.

Circle 283 for more information

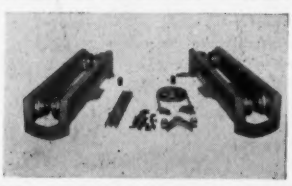
King-Size Winch-Hoist



An all new lightweight two ton winch-hoist with 20 feet of cable has been introduced by The Lug-All Company. It lifts, lowers or pulls two tons a distance of 10 feet when used double cable or handles one ton a distance of 20 feet when used single cable. The winch-hoist weighs 15 pounds and features a rugged, protective type main frame that allows instant inspection and easy cleaning, oiled-for-life bearings, stainless springs, three workable hooks, smooth operation in any position and a built-in pulley that can be used as a snatch block in close work. Reversible handle is removable.

Circle 284 for more information

Build-It-Yourself Crane



Conco Engineering Works, Material Handling Division, has introduced a new series of build-it-yourself crane assemblies, designed to save time, labor and shipping costs. Available on a package

Get rid of Parts-Handling **Headaches** for good!

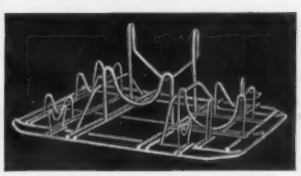
You can simplify handling and speed production flow—permanently and economically—with WIPCO Custom Baskets and parts-handling products! Specially designed to meet the requirements of your specific handling system, WIPCO handling products put parts *where* you want them, *when* you want them, and *the way* you want them! They protect parts from damage, dirt and spillage—step-up efficiency in conveying, assembly, dipping, pickling, painting, drying, draining and degreasing operations.

WIPCO engineers have designed thousands of baskets, racks, trays, conveyor hooks and hangers for every type of application. Let them show you how to cure your parts-handling headaches for good! Write today and tell us your requirements.

WIPCO

CUSTOM BASKETS AND PARTS-HANDLING PRODUCTS

ANY Size, Capacity, Mesh, Metal or Finish—for ANY Requirement!



A specially designed rack for assembly and storage of transmissions.

For special applications, WIPCO custom baskets can be made of steel, galvanized, stainless, Monel, copper, bronze, aluminum or any other metal.

Check Our Complete Line of Parts-Handling Products.

WRITE TODAY FOR BULLETIN MS-521

WIRE & IRON PRODUCTS, INC. 1720 Sixteenth St., Detroit 16, Mich.

Circle 195 on Reader Service Card for more information

basis are an underhung hand geared crane assembly, top running crane assembly, single trolley and multiple trolley underhung push type crane assemblies. According to the manufacturer, any of the assemblies can be built by one man in a few hours without special tools or skills.

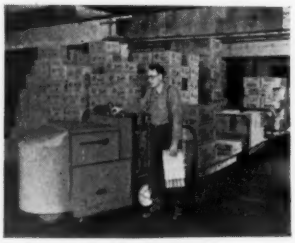
Circle 285 for more information

"Mighty Mover"

Moving bulky machinery or heavy equipment is accomplished easily with these unique dollies, tradenamed "Mighty Movers" and manufactured by Acorn Company. Used in sets of four, each dolly has two 4-inch roller-bearing cast iron wheels and steel sides and top plates. The top swivel plate has a standard ½-inch threaded hole to which machinery is bolted after being jacked up. Uneven or rough floors are no problem, nor are turns. Any machine weighing up to 180,000 pounds can be moved in aisles no wider than the machinery being moved.

Circle 286 for more information

Dual-Controlled Tow Truck



Tow-Bear Division, Hudson House, Inc., announces a hydraulic, 3-wheel tow truck equipped with dual controls which allow the operator to start or stop the machine while walking along either side, as well as when riding. The truck operates on automotive-type batteries and has a built-in charger. Recharging is accomplished by plugging into any 110-volt wall socket.

Circle 287 for more information

Easy Chain Selection

Measuring of lengths of chain in warehouse aisles can be eliminated with Campbell Chain Company's new method of marking. Every five feet of the firm's various types of chain are marked in separate colors to simplify handling and identification. The number of feet desired can be quickly obtained by counting the five foot markings.

Circle 288 for more information

UNITABLE®

BELT CONVEYOR

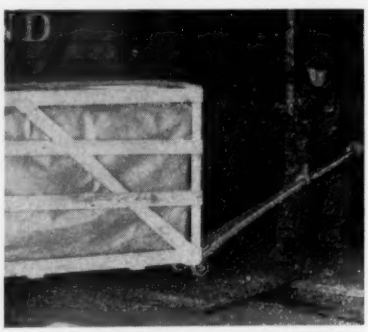
For Assembly - Inspection - Packaging

The most ADAPTABLE portable conveyor you can find. Exclusive "unitized" design 10' to 80' lengths. Write for UNITABLE Bulletin now.

CONVEYOR SPECIALTY COMPANY INC.

36 Newport Avenue
North Quincy 71, Mass

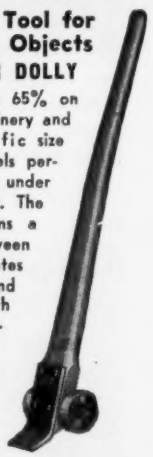
Circle No. 51 on Reader Service Card for more information



A Low-Cost Tool for Moving Heavy Objects

THE MICRO LEVER DOLLY

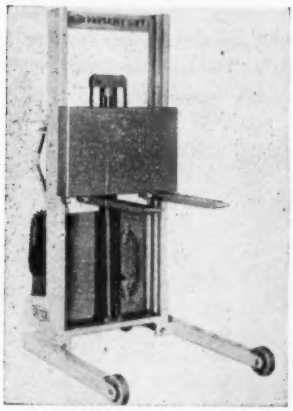
Cuts moving time up to 65% on large cases, crates, machinery and bulky items. The scientific size and position of the wheels permit the lift blade to pry under objects flat to the floor. The wheel position also gains a high leverage ratio between power and load. Eliminates the danger of tip-ups and high falls. Four sizes, with a choice of metal or rubber wheels. See your local distributor or write:



MICRON, INC., Dept. F., Bettendorf, Ia.

Circle 121 on Reader Service Card

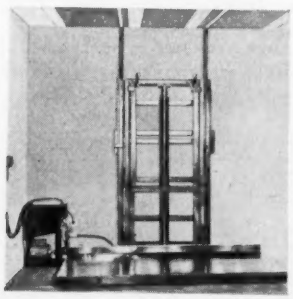
Four-In-One Carrier



This unit actually provides four carriers in one: a platform truck, straddle fork truck, portable elevator and shop crane. The 2000-pound-capacity, manually propelled, hand or battery-powered hydraulic lift is being introduced as part of a complete new line by The Oster Manufacturing Company. Features include adjustable legs which allow the carrier's legs to ride straddling the load or beneath the load, newly-designed adjustable forks and remote control as standard equipment at no additional cost on power models.

Circle 289 for more information

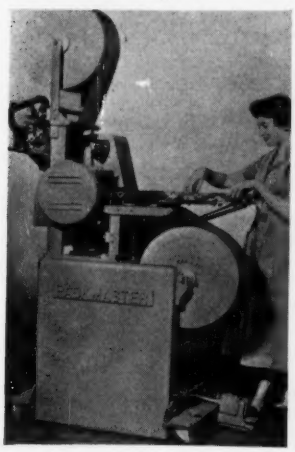
Automatic Transfer



Automatic floor-to-floor transfer of freight can be accomplished at the touch of a button with the new florLIFT introduced by the Florlift Corporation. Constructed of steel, the unit efficiently lifts up to 750 pounds from one floor to another at the touch of a button. Two roller chains assure safety and automatic stops prevent overrunning. The hydraulic circuit is mechanically locked in position should the power fail.

Circle 290 for more information

Counts, Packages and Prints Automatically



Automatic imprinting of complete descriptive data, government specifications, trademark design or other data on heat-sealed paper or film packages, in addition to packaging and counting operations can now be done with the Packmaster Model 50. Equipped with a Markem Model 76A printer, it forms, fills, imprints and counts packages from 3" x 2"

Circle 167 on Reader Service Card for more information

ANOTHER FIRST FOR

SILENT HOIST KRANE KAR

FLUID DRIVE!

Write for New Illustrated Bulletin No. 79D

Silent Hoist gave you *KRANE KAR*, the first modern Mobile Crane . . . Front-Wheel Drive . . . Stability without Stabilizers . . . Lifetime Front Axle . . . Automatic Safety Controls. And now *Silent Hoist* gives you **FLUID DRIVE!**

✔ **Increases engine clutch life.** ✔ **Provides cushioned starting and acceleration.** ✔ **Eliminates overload shock damage to drive gears.** ✔ **Speeds operation.** ✔ **Cuts maintenance drastically.** ✔ **Prolongs tire life.**

Ask about the New Lease-a-KRANE KAR-Plan . . . 1 to 3 Year Lease with Option to Purchase

KRANE KAR Swing-Boom Industrial Truck Crane . . . 1½, 2½, 5, 10, 12½ Ton Cap.

SILENT HOIST & CRANE CO.

Pioneer Mfrs. of Heavy Duty Materials Handling Equipment

888 62nd Street, Brooklyn 20, N. Y.

"Most Efficient Yard Crane We've Used"

Says

Henry J. Hettinger

Asst. Supt. in Charge of Maintenance Greenpoint Works Brooklyn Union Gas Co.

KARRI-GO

FRONT-BOOM MOBILE CRANE

5 and 7½ Ton Cap.

FEATURE: *"Live Boom" with Hydraulic Power Topping*

"Our *KARRI-GO* saves us time and money," says Mr. Hettinger. "The short turning radius makes it very flexible. It does many jobs faster, more economically than our three big cranes. We use it indoors and outdoors . . . for removing and installing underground cable, 12" pipe, valves, large valve bonnets and gates. On repairs, the *KARRI-GO* carries motors, speed-reducers, compressors, pumps, and other machinery to and from the machine shop. Handles reels, 55-gal. drums, steel beams and forms; it loads and unloads trucks; stacks materials for storage. This *KARRI-GO* has to cover a lot of ground . . . the area of our yard is over 115 acres. To carry bigger loads and cut down travel trips, we often attach a trailer to the pintle hook. Doing a fine job here."

Send for Bulletin #73C

Mfrs. of KRANE KAR Swing-Boom Mobile Crane

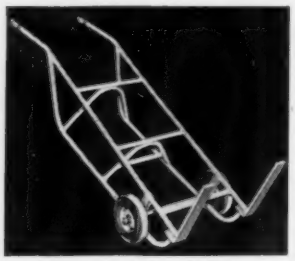
SILENT HOIST & CRANE CO., 888 63rd ST., BROOKLYN 20, N. Y.

Circle 166 on Reader Service Card for more information

to 6″ x 6″, at rates from 40 to 80 per minute depending upon material used and object being packaged. Manufactured by Packmasters.

Circle 291 for more information

Multi-Purpose Hand Truck



Although designed specifically to handle gypsum lath, this hand truck is said to be ideal for handling crates, case goods, strip steel, machinery and many other items. Manufactured by U. S. Products, Inc., and designated the RL-10, it features perfect balance, rugged construction and extra heavy duty 10-inch solid rubber wheels. With this truck, one man can handle more than 1000 pounds.

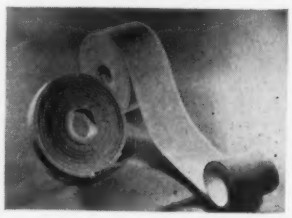
Circle 292 for more information

Oil-Resistant Belting

Hewitt-Robins, Inc. has developed a conveyor belt which features greater resistance to the penetration of vegetable and animal oils and fats. Made with a nitrile synthetic rubber cover, the belt is designed for use in food processing plants, feed mills and textile mills, and is available with a smooth top for horizontal haulage, rough top for inclines, declines.

Circle 293 for more information

Cushioning Tape



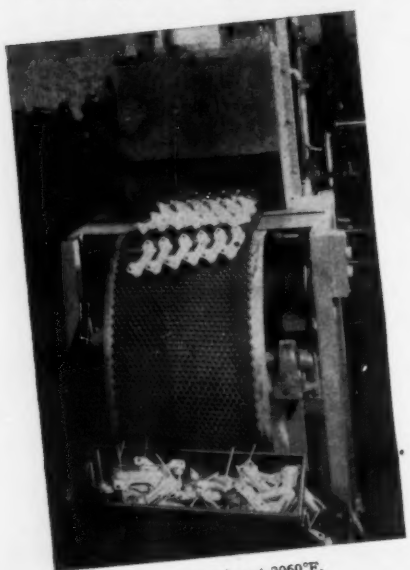
Tesamoll Tape, a foam plastic with pressure-sensitive backing offers cushioning characteristics variable according to respective applications. It is said to allow beneficial attempts heretofore unavailable because of its combination of cushioning and sound-absorption facilities. Samples in either 1/8 or 1/4-inch thicknesses, with widths ranging from 3/8-inch to 19 inches will be sent on request. Manufacturer is United Mineral & Chemical Corp.

Circle 294 for more information

Removes Tramp Iron Automatically

Stearns Magnetic, Inc. has available a new line of Discardo cross-belt magnetic separators that remove tramp iron and automatically discharge it away from

Keep your product on the move . . .



Copper Brazing at 2060°F.

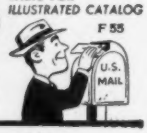
WITH ASHWORTH PROCESS BELTS

Woven from any metal capable of being drawn into wire form ASHWORTH belts afford a conveying medium in temperatures from sub zero to 2100°. Whatever your process—whether it be pickling, quenching, annealing, hardening or blueing—Ashworth belts can help you effect economies and *Keep Your Product on the Move*

ASHWORTH BROS., INC.
WINCHESTER, VIRGINIA

Sales Engineers: Atlanta • Buffalo • Charlotte, N. C. • Chicago • Cleveland • Dallas • Detroit • Greenville, S. C. • Los Angeles • Louisville • New York • Philadelphia • Rochester • Seattle • St. Louis • St. Paul • Canadian Rep., PECKOVER'S LTD., Toronto • Montreal

WRITE FOR ILLUSTRATED CATALOG F 55



Circle No. 18 on Reader Service Card for more information

Order Now . . . The 1956-57 FLOW Directory

FLOW DIRECTORY
1240 Ontario St. • Cleveland 13, Ohio

Send me ( ) copy(ies) of the 1956-57 FLOW DIRECTORY at $6.50 a copy.

Check enclosed ( ) Bill me ( )
Bill my company (Order No.)

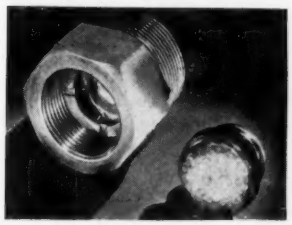
Please make checks payable to FLOW DIRECTORY. Ohio sales—add 3%

Name .....
Company .....
City ..... State .....

the flow of material in a continuous operation. The unit, supplied completely assembled, may be suspended above a conveyor belt, chute or sorting table.

Circle 295 for more information

Moisture Indicator



This "Bull's Eye Indicator" for dehydrated packaging, employs silica gel as a dessicant. The manufacturer, W. R. Grace & Co. recommends the indicator for special packaging applications including those involving pressure or vacuum and requiring a visual means of checking on relative humidity conditions within the container. The indicator consists essentially of a glass receptacle for blue indicating silica gel, which turns gradually to pink as moisture is adsorbed. A tight seal against moisture infiltration or loss of pressure is provided for, yet air within the container circulates freely through the indicating gel by way of holes in the back of the receptacle, permitting easy visual check on moisture without opening the package.

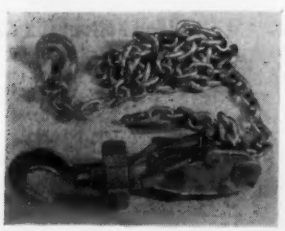
Circle 296 for more information

More Maneuverable Power Barrow

The Prime-Mover Company announces a new, shorter, more maneuverable ¾-ton-capacity power wheelbarrow. The new Model 15A is 64 inches long and 31½ inches wide, and has a completely new frame and control system. With this new unit, loads of bulk or solid materials can be hauled through any standard doorways or aisles, on elevators, over any kind of roadway and on slopes up to 20 percent. Flat beds for carrying solid materials, and dump buckets for liquid or bulk materials are interchangeable on the same chassis.

Circle 297 for more information

Light Weight Tie-Downs



These 3.3-pound tie-downs are claimed to provide a weight-reduction of more than 40 percent over previous equipment, and to offer further advantages of simplified initial application, tensioning and release up

THE DRIVER IS BOSS—Not the truck. Power steering means one finger turning, even at a standstill—Reduces operator fatigue and increases efficiency. No tripping over levers or hoses getting on or off either, all dials and levers are just inches below the steering wheel where they belong for effortless handling and added safety. Tilting mast (10° backward, 3-5° forward), speedy lift and 6 inches of free lift complete the picture of a real material handling tool.

POWERHOUSE ON WHEELS—The sturdy, 4 cylinder, industrial engine produces 40 Brake Horse Power — Oversized clutch, transmission and Timken drive axle deliver it without strain. Extra wide tires, front and rear provide the traction to take full advantage of it. Speeds up to 8 mph., forward or reverse.

COMPACT—Intersecting aisles need be only 64" wide. Only 38" x 76¼" (less forks), the W-40 turning radii are only 2" inside and 71" outside.

A SOFT TOUCH FOR MECHANICS, TOO—Here's a truck *designed* for economical maintenance. Tilt cylinders, engine, transmission, clutch and other wear parts are easily worked on or removed.

VERSATILE—Standard Lift is 108"—others to order. A wide variety of fork styles and attachments are also available.

LOTS OF OTHER FEATURES—including: double acting hydraulic brakes, honed tilt and lift cylinders; but why not get the complete story? Even with power steering and extra capacity the W-40 costs less. Call your Truck-Man dealer or write today for folder and price information on the NEW TRUCK-MAN W-40.

OTHER truck-man TRUCKS

MODEL Y-40—TWO TON, OUTDOOR HIGH-LIFT
MODEL DHP—4500 LB., LOW LIFT SKID TRUCK
MODEL DFP—3000 LB., LOW LIFT PALLET TOTER

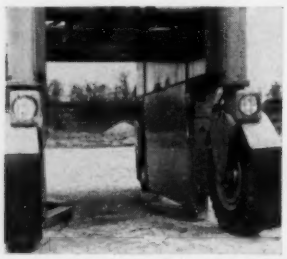
truck-man
DIV. OF THE KNICKERBOCKER CO.
582 LIBERTY ST., JACKSON, MICHIGAN

Circle 179 on Reader Service Card for more information

to 5000 pounds. They are identified as MB-1 tie-downs by the manufacturer, Eastern Rotorcraft Corp. Chain is automatically locked into position as it is inserted into the slot. Release mechanism permits the chain to be unloaded easily, even when under tensions of 5000 pounds.

Circle 298 for more information

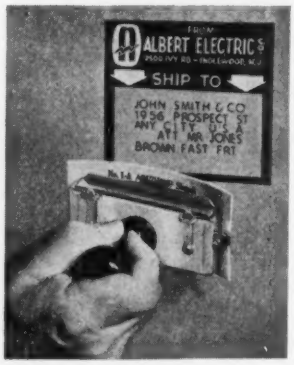
Carries Without Bolsters



Load hooks that pivot inward to permit carrying without bolsters have been incorporated on the new straddle carrier manfactured by the Ross Carrier Division of Clark Equipment Company. Pivoting movement is controlled by hydraulic cylinders actuated by a lever on the left side of the driver's seat. A second lever hydraulically controls the vertical movement of the hooks. Permanent skids or stringers are required only at pick-up and delivery points. The Series 81 Pivoted Hook Carrier has a capacity of 20,000 pounds, road speeds up to 40 mph, four-wheel steering, and a four-speed syncromesh transmission. Carrying loads range in height from 48- to 66-inches and in width from 40- to 52-inches.

Circle 299 for more information

Efficient Carton-Marking Method



The Multistamp Hand Stamp Stencil Duplicator is said to play a starring role in the new addressing system which uses pre-printed "ship-to" labels. At the time of carton manufacture, shipper's name and address, other standard shipping data as may be required, and a frame into which the "ship to" information is to be imprinted are pre-printed by the carton maker. Shippers use typewriter or ball-point stylus to fill in on a low-cost stencil all needed information. Then, the stencil is snapped onto the duplicator and it is ready for printing.

Circle 300 for more information

Why STERLINGS are MAN'S BEST Materials-Handling FRIEND!

1. ALWAYS READY to use . . . no fuel or other "operating supplies" needed.
2. NO "STARTING" Problems . . . regardless of cold, heat, rain, dust.
3. NO "HOUSING" Problems . . . no protective warehousing needed, no covering, no "babying".
4. NO MAINTENANCE Problems . . . nothing to get out of order . . . rugged, long-lasting.
5. EASIEST WHEELING . . . with choice of pneumatic, semi-pneumatic or steel-tired wheels (with plain, ball or roller bearings.) These are the easiest rolling wheelbarrows made!
6. EASIEST on the barrow man . . . engineered to balance 4/5th of load on the wheel; only 1/5th of load at handle grips.
7. EASIEST CLEANEST-DUMPING . . . steel trays engineered to unload completely, with least effort.

Costs Less per Year

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STERLING WHEELBARROW CO., Milwaukee 14, Wis.

Look for this Mark of STERLING Quality

Sterling WHEELBARROWS

Circle No. 172 on Reader Service Card for more information

CESCO'S TOTE-SHOP BOXES

DO YOUR ROUGH/TOUGH JOB EFFICIENTLY·EASILY·ECONOMICALLY

on Conveyors • Pallets • Hand Trucks Skid Platforms or what have you

STACK SECURELY, CONVENIENTLY!

Solve your Storage and Handling Problems with our Tote Boxes, Trays and Pallets. Write today for quotations on special sizes. Special Marking Facilities, for identification purposes, are available in various colors and numbers. Please submit detailed specifications.

Model # WB—Wood Bottom (Illus.)

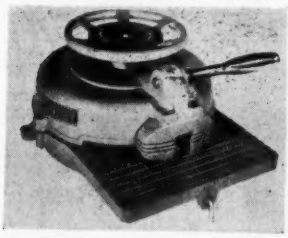
STANDARD SIZES AVAILABLE FROM STOCK

Model	Size	Length	Width	Depth	Weight
WB-1	I. D.	14⅞"	11¾"	9"	11¾ lbs.
WB-2	I. D.	18"	11¾"	9"	13 lbs.
WB-3	I. D.	20"	11¾"	9"	14 lbs.

CESCO CONTAINER CO.
Factory NORTHAMPTON, MASS
General Offices:
Dept. (F) 475 Fifth Ave., New York 17, N.Y.

Circle No. 39 on Reader Service Card

Redesigned Stencil Cutter



A lighter, faster, more efficient stencil cutting machine is said to be the result of engineering changes in the Diagraph-Bradley Stencil Cutting Machine. Aircraft aluminum allow construction reduces overall weight and because all spinning parts are 2/3 lighter than in previous models, the machine is 30% faster to operate. The machine also features contour designed feed mechanism housing; special feed wheels for pin point accuracy; flat top head design for cleaning. Made by Diagraph-Bradley Industries, Inc.

Circle 301 for more information

Off-the-Road Shock Absorbing Caster

This 16-inch dual wheel shock absorbing caster was developed by Modern Caster Company for safe transportation of valuable cargo over highway and off paved surfaces. Each wheel is

Circle 176 on Reader Service Card for more information

Stop dangerous handling of INDUSTRIAL LIQUIDS

You can stop dangerous handling of liquids with Tokheim high vacuum pumps. Their use in maintenance work will help prevent spilling, slopping, over-filling and dripping—all enemies of safety. This means your plant can be kept cleaner—work is speeded—waste halted—accidents prevented.

Tokheims are available with hose or spout outlets and other optional attachments. Pump operates on both forward and back strokes—delivers 20 gallons a minute. Will pump 'most anything that pours. Offered with alternate parts to handle special liquids.

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General Products Division

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MERCURY
The most complete line of industrial gasoline and electric TRACTORS

Tonnage Travels for less on the Mercury "Trackless Train"

For speedy, low-cost material movement in your plant Mercury Tractors are your best bet. "Tug" electric and "Banty" gas models, either 3 or 4 wheel type with cushion or pneumatic tires are available for general purpose work. "Huskie" and "Super-Huskie" gas tractors for heavier duty. LP Gas fuel systems optional. Write for free literature.

"TUG" Model 550 Electric Tractor.

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Chicago 9, Illinois

Circle No. 119 on Reader Service Card

AT JACOBS MANUFACTURING

THE SHORTEST DISTANCE

ORDER DESK *between these two points* SHIPPING PLATFORM *is*

By stocking their entire line of chucks and parts on two parallel banks of Quik-Pik, Jacobs is now able to move orders more quickly and efficiently from reserve to the shipping platform. Picking and restocking operations are segregated and may be carried on simultaneously. Order pickers' non-productive walking has been cut 35 percent. Productivity has increased 50 percent.

***Quik-Pik®** can . . .*

be applied to order picking or items of many types, shapes and sizes. Units engineered to meet individual requirements and specifications.

***Quik-Pik®** cuts costs because . . .*

- Order pickers' non-productive walking is cut by as much as 75%
- Items automatically slide into the best selecting position
- Selecting accuracy is increased
- Selecting and restocking operations are segregated
- Rotation of stock is assured
- Inventory taking is easier

Find out, today, how Quik-Pik can improve your operation, too!

NORTH AMERICAN EQUIPMENT CORPORATION
250 Vreeland Avenue, Paterson, N. J.

Circle No. 137 on Reader Service Card for more information

cantilever mounted and has an independently-operated shock absorbing suspension system having a 3-inch total amplitude of mechanical deflection. The spring rate increases in proportion to load increases to insure a smooth ride for all loads. The caster is equipped with a floor lock which will maintain locking contact regardless of equipment height variations.

Circle 302 for more information

Increased Applications for Loader

The new "Speed Swing" 180-degree swing loader manufactured by Pettibone Mulliken Corporation features more rugged construction and increased ease in handling big loads. The 180-degree boom swing feature is said to be invaluable on narrow streets, crowded off-highway jobs and any other area in which maneuvering is difficult. Custom attachments include a 4-cubic-yard snow bucket, crane tote hook, hydraulic crane extension and fork lift, and performance as a front end loader with a 5000-pound capacity.

Circle 303 for more information

Make Your Own Tape

The Williamson Tapemaker, a development of Williamson Adhesives, Inc. is designed to produce a continuous supply of pressure-sensitive cellophane tape at the point of use. It can be stopped and started up again for any length of time and is always ready for operation when needed. Tape which it dispenses is ready for instant application.

Circle 304 for more information

Features Fingertip Control

There is no clutch nor gears to shift in the new Model L-524, 5000 pound capacity at 24 inch load center fork truck offered by Lamson Mobilift Corporation. Powered by a Chrysler six-cylinder industrial engine, the Mobil-Matic direction

Seven Major Consolidated Freightways Terminals

Save 25% with *Nutting* Tow-Line Trucks

In addition to 25% savings in cross dock handling, Mr. J. H. Howay, Supt. of Terminals, reports reduced damages, speeded up departure schedules and fewer astray shipments.

In motor freight terminals, plants and warehouses, Nutting Tow-Line Trucks are cutting costs daily. Here's why . . .

- Less Supervision
- Unattended Transportation
- Less Maintenance Cost
- Reduced Handling Cost
- No Unpleasant Exhaust Fumes
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Whatever your loads and operating conditions—whether for Tow-Line Systems or for manual operation, there are Nutting Trucks to exactly suit your needs. Investigate cost-cutting Nutting Trucks today.

For complete details write for your copy of Bulletin 54-TL. Or call your Nutting Sales Engineer . . . he's listed in the yellow pages under "Trucks" or "Casters".

NUTTING TRUCK & CASTER CO.

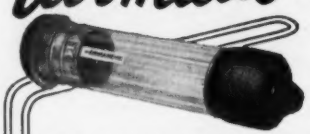
1600 DIVISION ST., FARIBAULT, MINN.

QUALITY BUILT *Since 1891*

Export Sales Rep.: Scheel International, Inc. 4261 No. Lincoln Ave., Chicago 18, Ill.

Circle No. 135 on Reader Service Card for more information

Airmatic...



THE MODERN MECHANICAL MESSENGER SYSTEM

Airmatic pneumatic tube systems do their jobs so smoothly, so efficiently, so quickly that they don't receive any "fanfare" and "fuss". They're just taken for granted as time, labor and money savers in providing for the transporting of bottles, parts, samples, fragile medical supplies, complete files and IBM cards as well as the traditional uses for transporting papers and money.

There's an AIRMATIC SYSTEM for your need. Contact your local representative or the AIRMATIC home office for further information.

AIRMATIC SYSTEMS, INC.

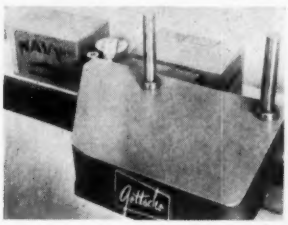
378 Bergen Blvd., Fairview, N. J.
Phone: Cliffside 6-0475

Circle No. 5 on Reader Service Card

control is the heart of the transmission system. All controls are located at the operator's fingertips. The truck has been designed for easy operation, driver safety and comfort, plus a minimum of maintenance.

Circle 305 for more information

Dual-Action Conveyor-Line Marker



A solenoid activated, dual-action conveyor-line attachment that simultaneously marks both the rear and one side panel of shipping cases has been developed by Adolph Gottscho, Inc. The new marker, designated as the "201 Rolacoder", can be attached to a conveyor, case-sealer, or other handling machine where it automatically imprints code-dates, lot numbers or other legends on cartons or cases as they move along the line. It may also be used for marking the rear panel.

Circle 306 for more information

Inexpensive Steel Pallet

The Union Metal Manufacturing Company is marketing a reversible steel pallet which is said to be inexpensive. The pallet is constructed of two corrugated steel decks, corrugations on one deck running

Circle 59 on Reader Service Card for more information

less work . . . more profit in scrap salvage with a

DILLON
Weight Indicator

Systematize scrap salvage . . . it pays more! And a vital factor in many plants is the DILLON Weight Indicator. Keeping a constant, accurate check on the amount of scrap collected in individual bins is an *easy job* for this rugged, time-proved, field-tested instrument. DILLON Weight Indicators adjust for tare . . . attach to any hoisting crane for on-the-move readings . . . are available with capacities of 0-250 lbs. up to 0-5,000 lbs. 360° swivel hook. 16" diameter dial.

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"PALITON"

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4,600 lb.—at the
Same Low Price

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Fork Lengths 36"-42"-48"
Widths 20½" and 27"
Specials to Order.

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Threeway Control for
Raise, Lower and
NEUTRAL Giving FREE
HANDLE for Towing.

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The Paliton Hand Pallet Truck
With Five Inch Hydraulic Lift.

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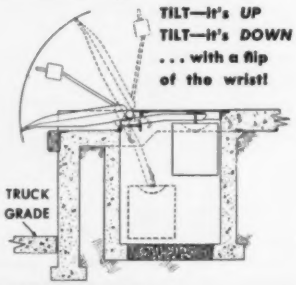
Circle 105 on Reader Service Card for more information

RITE-HITE ADJUSTABLE LOADING RAMPS

the secret is PRECISION COUNTERBALANCING for smooth-as-silk operation

What could be simpler? Counterweight controls vertical adjustment. Ramp floats in position, rides up or down with level of truck bed. RITE-HITES take years of punishment without failure, thanks to heavy bridge-like steel construction. It will pay you to specify RITE-HITE for your clients' loading docks.
See RITE-HITE catalog in Sweets Industrial Construction File or send for descriptive literature.



You can be sure—when it's a RITE-HITE it's RIGHT!

RITE-HITE DIVISION Dept. F-16
LOOMIS MACHINE CO., 4th and PINE STS., CLARE, MICH.

HAMILTON CASTERS FOR Every Industrial Use!

The Hamilton caster line is extensive and exceptionally complete! Hamilton manufactures hundreds of styles and sizes, including swivel and rigid casters of forged steel, plate steel, cast steel, pressed steel and semi-steel. Single and double-wheel models. Wide range of capacities—up to 2,500 lbs. per caster.

Wheels available include steel, semi-steel, molded-on rubber-tired wheels, renewable rubber tires, full pneumatics, semi-pneumatics, molded plastic and composition rubber wheels. If you use industrial casters—whatever the application, whatever the quantity—get a quotation from Hamilton. Write today and tell us your requirements.

SEND FOR YOUR COPY OF THE HAMILTON CASTER & WHEEL CATALOG

Hamilton
CASTER & MFG. COMPANY
1672 Dixie Highway, Hamilton, Ohio

Circle 79 On Reader Service Card for more information

NEW EQUIPMENT SECTION

at right angles to those on the other deck. These open-end, criss-cross corrugations, 2½ inches deep on nine-inch centers, permit four-way entry for lift trucks, and are said to provide greatly increased strength.

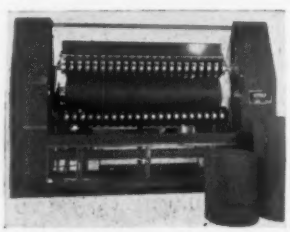
Circle 307 for more information

Short Turning Radius

Unexcelled maneuverability in narrow aisles is claimed for the HC-50 fork truck by Hyster Company. The 5000 pound capacity truck features an outside turing radius of 79 inches, 24 inch load center, short length, narrow width and ease of steering. Weight of the truck is 7110 pounds; powered by a Waukesha gasoline engine.

Circle 308 for more information

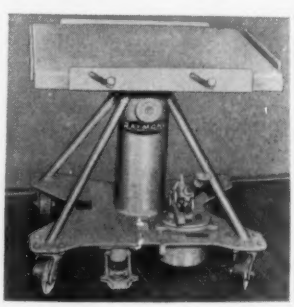
Automatic Rolling Machine



The new Dyken Rolling Machine automatically rolls and, if desired, wraps lengths of pliable material. It converts large rolls to small rolls and handles a wide variety of materials including: paper, foam rubber, plastics, insulation, aluminum and copper sheets. Illustration shows rear view of unit. Automatic measuring and cutting-off attachment and automatic paper dispenser are also available.

Circle 309 for more information

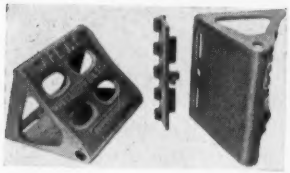
Retaining Bars For Elevating Tables



Retaining bars with two hook-shaped slots which permit them to be instantly set in two fixed positions are the latest feature offered by The Raymond Corporation for its line of hydraulic elevating tables. In the raised position the bars form a one-inch high fence on four sides of the table; in the lowered position the tops of the bars are flush with the top surface of the table. Table now in use can be equipped with the new bars by drilling two holes through each edge of the table top.

Circle 310 for more information

Handy Wheel Block



The Casteel Utility Wheel Block, manufactured by Calumet Steel Castings Corp. is said to combine great strength with light weight and compact size. Handy to use, easy to set or remove, it holds fast on every surface with ample factor of safety for the heaviest equipment. Design affords stiffening members at the rear corners. They serve as convenient handles as well. A curved face provides maximum tire contact and even load distribution.

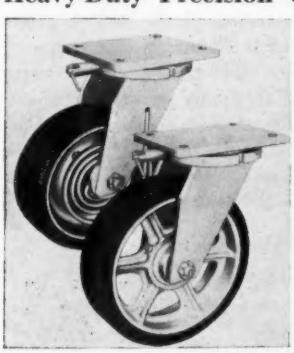
Circle 311 for more information

"One-Man, One-Vehicle" Cargo Handling

A hydraulic lift designed to provide "one-man, one-vehicle" ground handling of air cargo is being manufactured by Keystone Engineering Company. Tradenamed "Keylift", the unit can handle a maximum payload of 3500 pounds, lifting it from a minimum height of 32½ inches to a maximum of 124 inches. A 4-cylinder engine is governed to a speed of 12 miles per hour in compliance with airport regulations. One-man operation is made possible by means of a remote control lifting and lowering mechanism, operated from either the driver's seat or from the platform.

Circle 312 for more information

Heavy-Duty Precision Casters

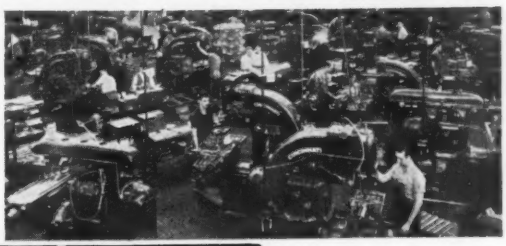


The Bassick Company announces a new line of 8, 10 and 12-inch casters which have been engineered to meet military specifications for precision rigid and swivel casters. In conformity with MIL-C-4749, these heavy-duty casters support as much as 950 pounds for long distances, at towing speeds up to 20 miles per hour. Features include sealed swivel and wheel bearing assembly to keep out dirt, water and foreign matter; sealed tapered roller bearings throughout; four-position swivel locks and a tough, resistant finish.

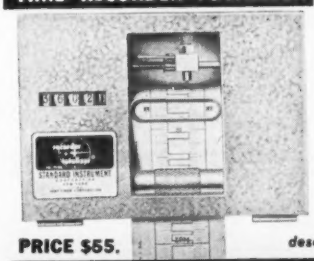
Circle 313 for more information

Circle 87 on Reader Service Card for more information

To be sure! YOU CAN GET BETTER PRODUCTION IN YOUR PLANT



TIME RECORDER-TOTALIZER



• This precision instrument provides accurate, permanent, chronological data about any machine, process or system in plant or office ...on a continuous chart-roll which lasts four months. Uses no ink. Totalizer shows accumulated "on" time.

PRICE $55.

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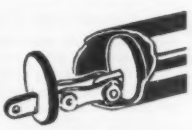
CATALOG SHOWS HOW YOU CAN CUT COSTS and solve handling problems with Hapman TUBULAR CONVEYORS for wet or dry bulk flowable materials

—metal chips—chemicals—foods

A fact-packed catalog—shows application and advantages of Hapman Chain-Flight Tubular Conveyors.

REQUEST YOUR COPY OF CATALOG F-16

Details of new metal-belt PAN-LINK Conveyor for bulk chips, turnings, broken glass, etc., available on request.



Hapman CONVEYORS, INC.
DIVISION HAPMAN-DUTTON COMPANY
KALAMAZOO MICHIGAN
In British Commonwealth & Europe: Fisher and Ludlow Ltd., Birmingham

Circle 80 on Reader Service Card for more information

Circle 147 on Reader Service Card for more information

HEAVY DUTY FORK LIFT TRUCK
FOR PAVED OR UNPAVED AREAS

Lowers handling costs—Easily handles bulky or heavy loads (up to 5000 lbs.)—11" under-clearance and super traction permits operation where others cannot. 10' tower telescopes to 98½"; Power tilt forward 4°, backward 10°; 5 forward speeds, 1 reverse; Road Speed 20 M.P.H. Excellent Visibility. Easy operation with power steering, hydraulic operated clutch and brakes.

Service and parts for chassis available at International Harvester Dealers throughout U. S.

Complete line of optional equipment available.

We also manufacture Trac-Lift Models 20L, 20 and 40 with 2000 to 4000 lbs. capacity.

Write or phone for complete information

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Moving or Storing is Rapid, Convenient and Inexpensive with

IRONBOUND SEMI-LIVE SKID PLATFORMS

Ruggedly built with capacities up to 2500 lbs. These units are quickly made mobile with the use of low cost lift jacks . . . One of the methods that Ironbound engineers use to increase production and conserve space at low cost.

SEMI-LIVE SKID WITH BOX TOP

. . . permanently attached or removable. Also available with many other superstructures to "Short-Haul" your products thru production or into storage. Useful in hundreds of spots in every plant.

THE IRONBOUND "SAFETY-SKID" WITH ROUND CORNERS

Ironbound construction assures long hard use with complete safety to product and operator. Still the time proven method for handling of materials efficiently and economically.

Ironbound

IRONBOUND
BOX & LUMBER COMPANY
Materials Handling Division
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MANUFACTURERS OF QUALITY BUILT SKIDS, SEMI-LIVE SKIDS, FLOOR TRUCKS, ROLL TRUCKS, DOLLIES AND PRY BARS

Circle 91 on Reader Service Card for more information

NEW EQUIPMENT SECTION

Semi-Automatic Heat Sealer

Designed to give packagers of commercial and military products a high-speed, efficient heat sealing machine, the Comet 54 series of Product Packaging Engineering seals coated or laminated materials to government specifications, regardless of wrinkles or splices. Model 5440 contains an automatic tripping device that controls the heat-sealing cycle and requires only simple preliminary hand settings for time, heat and pressure. No foot or hand switches are required.

Circle 314 for more information

Small, Compact Converter

A small converter, or heat exchanger regulator, has been developed by Century Gas Equipment Co. for industrial trucks and tractors of 100 hp or less. This two-stage converter features a built-in atmospheric lockoff and cast-in passages for gas and water. Small and compact, it measures 5¼ inches in diameter and 3 inches deep and weighs 3 pounds. It is built of aluminum alloy and has a pressure relief back gasket which eliminates damage due to freezing.

Circle 315 for more information

Filament Reinforcement Tape

Tuck #189, a cellulose acetate plastic-backed, pressure-sensitive tape with glass filament reinforcement has been added to the line of Technical Tape Corp. It has tensile strength of 500 pounds per inch or width and 50 ounces per inch adhesion. It comes in ⅛-inch gradations from ¼ to 1 inch.

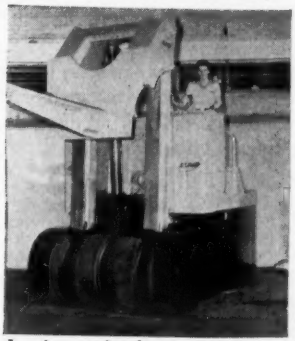
Circle 316 for more information

Weather-Resistant Fibre Board

A tough, highly flexible, weather resistant fibre board, said to have superior finish, is now being produced by National Container Corp. as the result of a new production method. Outstanding among the features of the process by which the combiner produces the board is a special roll lamination method, effected without the aid of heat. The sheet thus produced is a solid fibre board which reportedly does not lose any of its strength or flexibility in manufacturing.

Circle 317 for more information

Improved Heavy-Duty Ram Trucks



Said to provide the ultimate in heavy-duty coil handling equipment, a new series of ram trucks, with capacities from 20,000 to 80,000 pounds, is announced by The Elwell-Parker Electric Company. Features include dual power plants with separate drive motors and reduction units for each pair of drive wheels; maximum motor protection with drive motors located inside the frame; special narrow width design for operation in confined areas; dual lift cylinders and power operated hydraulic brakes in drive wheels.

Circle 318 for more information

Completely-Assembled End Gate

A hydraulic end gate which is shipped from the factory completely assembled is announced by the Perfection Steel Body Company. Rated at 2500 pounds lifting capacity, the end gate is suited for all trucks with capacities of 1½ tons and over, with maximum floor heights of 56 inches. A set of control levers on each side of the end gate permits operation from either side of the truck. Further, control levers are independent—one for elevating and lowering, one for closing.

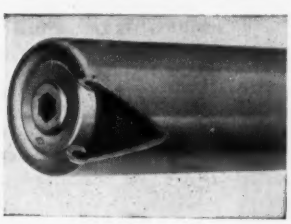
Circle 319 for more information

"Frameless" Dump Trailer

A "frameless" dump trailer has been announced by Anthony Company. When dumping a load, the entire front end of the trailer is lifted by a hydraulic telescopic cylinder mounted on the tractor fifth wheel coupling. In raising or lowering, the trailer body pivots around the rear wheels and tubular stabilizer arms pinned both to the hoist fifth wheel and the trailer body give added support.

Circle 320 for more information

Trouble-Reducing End Roller



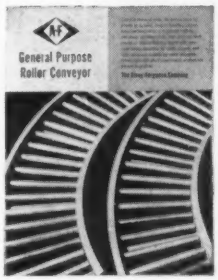
An integral end conveyor roller developed by The Alvey-Ferguson Company is said to eliminate roller-caused damage to products, packages and cartons, as well as jamming and tieups with resultant

Circle 9 on Reader Service Card for more information

A-F

Announces New

General Purpose Roller Conveyor



Moderately priced, pre-engineered selections from the famous A-F line of engineered roller conveyor

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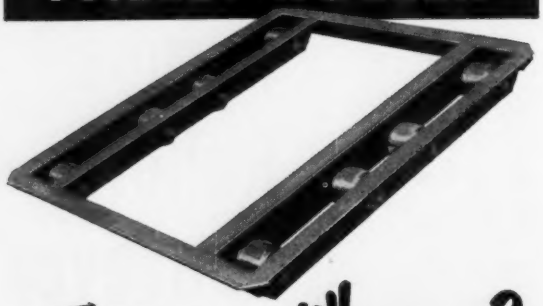
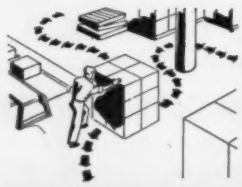
"ACE" SWIVEL KING PALLET ROLLER



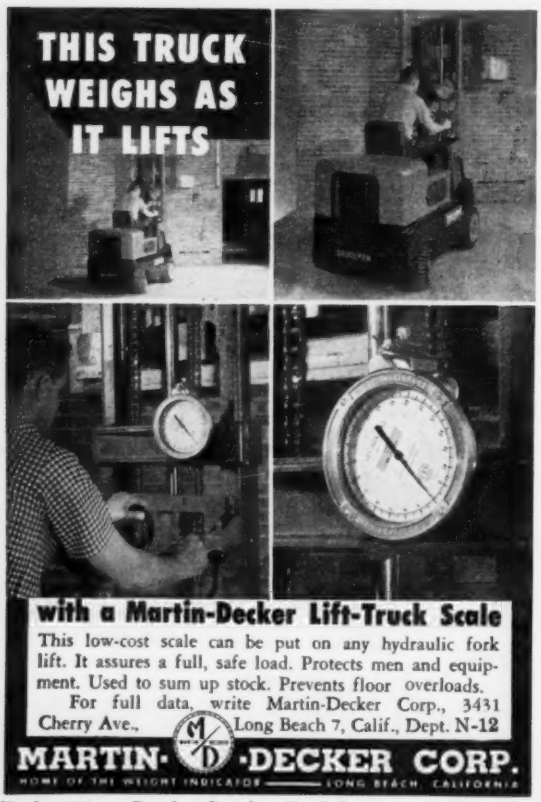
ANY OLD DIRECTION Who cares?



ACE SWIVEL KING PALLET ROLLERS permit effortless movement of palletized loads in any direction and to any location needed. They speed up material and product movement and remove congestions when fork trucks are not available; eliminate costly delays. Ask for Eng. Bulletin 104K.

FRANK L. ROBINSON COMPANY
Industrial Engineers • Manufacturers • Distributors
LATHAM SQUARE BLDG. OAKLAND 12, CALIF.

THIS TRUCK WEIGHS AS IT LIFTS



with a Martin-Decker Lift-Truck Scale

This low-cost scale can be put on any hydraulic fork lift. It assures a full, safe load. Protects men and equipment. Used to sum up stock. Prevents floor overloads.

For full data, write Martin-Decker Corp., 3431 Cherry Ave., Long Beach 7, Calif., Dept. N-12

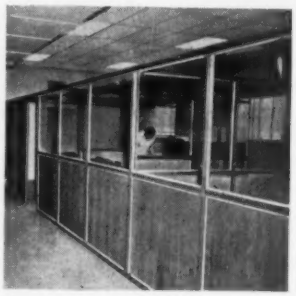
MARTIN-DECKER CORP.
HOME OF THE WEIGHT INDICATOR — LONG BEACH, CALIFORNIA

Circle 116 on Reader Service Card for more information

downtime. The roller houses its bearings in ends which are rolled inward to present smoothly-rounded end surfaces. This rounded lip design deflects products on and off roller conveyor lines without gouging.

Circle 321 for more information

Low-Cost, Easily-Erected Partitions



A new method for erecting low-cost permanent or movable partitions is announced by Unistrut Products Company. Unistrut steel channel is combined with any standard paneling material from ⅛ to ½ inch thick. Only simple tools and stock parts are required to erect the partitions. Channels are screwed to floor and wall abutments, upright channels are bolted into position and horizontal channels are bolted on. Standard panels are slipped into place and molding strips and corner cover plates complete the installation.

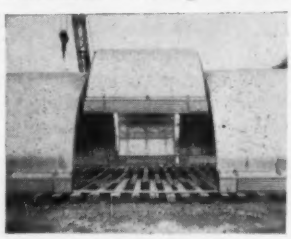
Circle 322 for more information

New Battery Features 20-Year Life

Said to last up to 20 years, this new nickel and cadmium battery has been developed by Saft Corporation of America. The manufacturer claims this hermetically sealed battery occupies less space, has higher peak discharge rates, longer life and is more durable. No fumes or liquids are given off in normal operation, and it is said to perform efficiently in temperatures ranging from —40 degrees F to 160 degrees F. Tradenamed Voltabloc, in sizes from 0.8 ampere hours.

Circle 323 for more information

Portable Storage Shelters

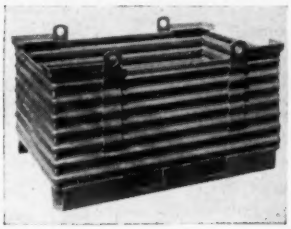


The portable sectional metal storage shelters manufactured by Yard-Stor Shelter Company are now available for emergency and temporary uses through local crane and fork truck rental services. The shelter sec-

tions are built in 8-foot panels which are easily handled by two men and bolted together. A new, replaceable self-fastening extruded double "V" rubber seal has been developed, and an improvement in cementing seals together at panel joints.

Circle 324 for more information

Skid-Box Features Safety



Safety features are stressed in this corrugated all-steel skid box with reinforced square corners manufactured by Palmer-Shile Company. Boxes are prevented from sliding off during stacking by the safety corners, which also afford increased capacity. Reinforced rolled edges also give greater strength and safety to the boxes, as do the lapped seams which replace butt welds. They have four-way entrances, and are built to customer specifications. Optional features include crane bars and stacking brackets.

Circle 325 for more information

Redesigned Straddle Carrier

Synchromesh transmission, full hydraulic control of load hooks and radi-arc steering are features of the Series 71 redesigned straddle carrier introduced by the Ross Carrier Division of Clark Equipment Company. Rated capacity of the unit is 10,000 pounds. It replaces Clark's previous model Series 70.

Circle 326 for more information

Live Storage Rack

A new live storage rack that permits first-in, first-out storage of loads is offered by The Alvey-Ferguson Company. A minimum number of rails are used as each rail serves two lanes. Guards are built integral with the rails, eliminating separate guard mountings. Length, width and height of the units can be varied to suit, and assembly is said to be simple.

Circle 327 for more information

Adjusts Automatically

Model 6MF, 10,000-pound capacity Adjust-A-Dock offered by Rowe Methods, Inc. can be completely or partially recessed in a dock. It features a manual floating design which automatically compensates for spring deflection of the truck bed.

Circle 328 for more information

Longer Battery Life

Polyethylene is being used exclusively for tubing and tube sealers by the Exide Industrial Division of The Electric Storage Battery Company, who say use of the plastic with its exclusive slotted tube plate design lengthens battery life and increases capacity.

Circle 329 for more information

Circle 120 on Reader Service Card for more information

YOUR BEST MOVE IS TO MOVE WITH
MERRILL
MATERIAL HANDLING DEVICES

For Interesting Information write
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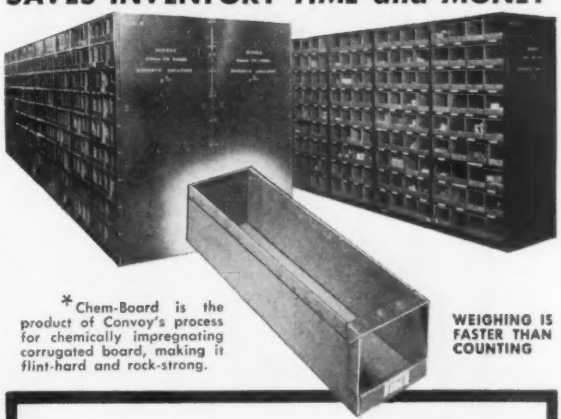
NEW CHEM-BOARD* BINBOX IDEA SAVES INVENTORY TIME and MONEY



*Chem-Board is the product of Convoy's process for chemically impregnating corrugated board, making it flint-hard and rock-strong.

WEIGHING IS FASTER THAN COUNTING

Instead of scooping out contents of a bin to count or weigh items at inventory time, the entire box is easily pulled out and weighed. Each stored part has a known count per pound. With the tare of the Convoy Bin Box established, the result is a tremendous saving in inventory time and effort.

Convoy Boxes may be *your* answer.

GET IN TOUCH WITH
CONVOY, INC.
CANTON 6, OHIO
P. O. Station B, Box 216-F

STANDARD AND CUSTOM-MADE NESTING, STACKING, and VERTICAL-SIDED CHEM-BOARD TOTE BOXES

Circle 47 on Reader Service Card for more information

Circle 63 on Reader Service Card for more information

Take advantage of Equipto's Free Layout Service to obtain valuable advice on the number and type of storage units to buy . . . complete floor plans and elevation drawings showing best way to arrange units within your allotted storage area. You will thus be able to make maximum use of your floor space, save steps, speed customer service, and simplify inventory and stock control.

If you would rather lay out your own facilities, send for fact-crammed, fully illustrated booklet, "How to Solve Your Storage Problems."

Both "assists" are further evidence of Equipto's primary concern with providing super-efficient storage facilities—not in merely selling equipment.

Equipto Division of Aurora Equipment Co.

805 Prairie Avenue, Aurora, Illinois

Steel Shelving . . . Parts Bins . . . Drawer Units

TRACTOR SHOVEL ON "SHUTTLE SERVICE" . . .

(*Continued from page 69*)

	Return to crude pile; fill hopper.
	Drive 180 yards to 1½-inch pile; load three trucks.
	Drive 230 yards to mill sand pile; load one truck.
2:00	Return to crude pile; fill hopper.
to	Drive 130 yards to grit pile; load one
3:00	truck.
	Return to crude pile; fill hopper.
	Drive 180 yards to 1½-inch pile; load two trucks.
	Drive 80 yards to 2½-inch pile; load two trucks.
	Return to crude pile; fill hopper.

On the day these observations were made, it was noted that the average production was not obtained. This was not due to equipment but rather to inclement weather. The ground was wet as a result of rain the night before. Temperature was about 40 deg. F. During the afternoon, a fairly heavy snowstorm blew intermittently. A biting wind blew all day.

Warren Foundry's General Superintendent Henry J. Schwellenbach believes the addition of the loader to the yard equipment has been a big help in speeding-up truck loadings, that the operators find it easy to drive and appreciate the work they get out of it.

Photos Courtesy Clark Equipment Co.

Speed up order picking and storage

JAKES SAFE-TOW CONVEYOR TRUCK

Saves valuable man hours in any warehouse

Easy rolling, rigid, one-man truck with quick connecting attachments for overhead or in-floor conveyors. Various platform sizes and capacities (2000 to 4000 lbs.). Rubber-tired or plastic wheels . . . any size you need. Steel or hardwood deck. Trailer couplings available.

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MODEL TT-18

JAKES FOUNDRY COMPANY

Established 1891

2800 Charlotte Avenue Nashville 9, Tennessee

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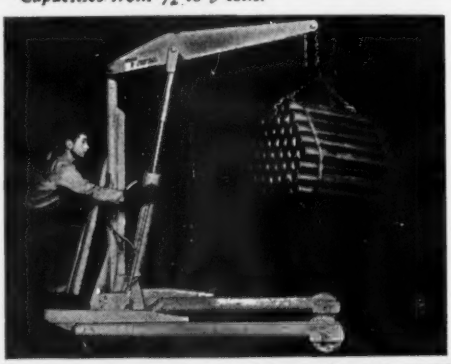
Anything You Can Hang on a Hook Can Be Easily Handled by a RUGER CRANE

Move heavy, bulky loads easily, quickly—with *one* man and a Ruger Hydraulic Floor Crane. Capacities from ½ to 3 tons.



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UHRICHSVILLE, OHIO

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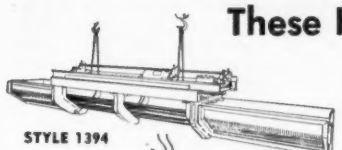
These Happen To Be For The Steel Industry



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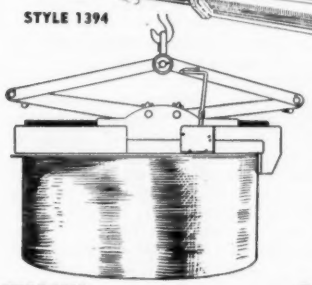

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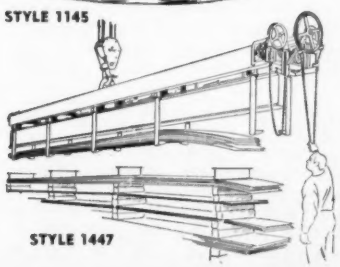

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—but MANSAVERS are also used by such industries as brass, aluminum, paper, auto, lumber, textile, publishing, box and barrel, and numerous others.

They transport sheet, rod, coils, wire, rolls, bales, even pallets and tote pans. In time and money saved, they usually pay for themselves in a few short months. Reduced spoilage and increased worker safety more than justify their intensive use in any field.

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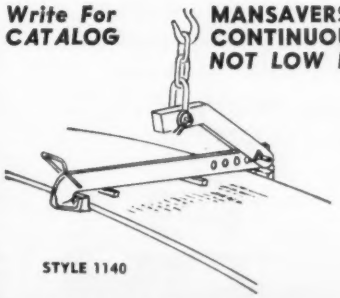

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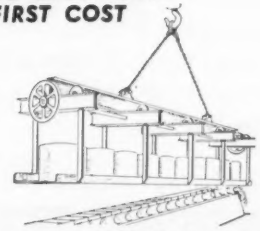

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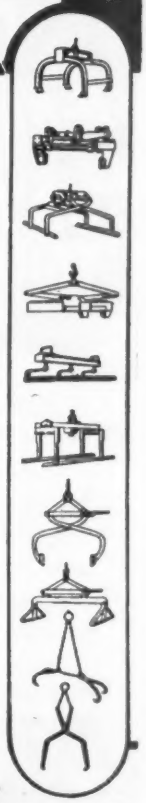
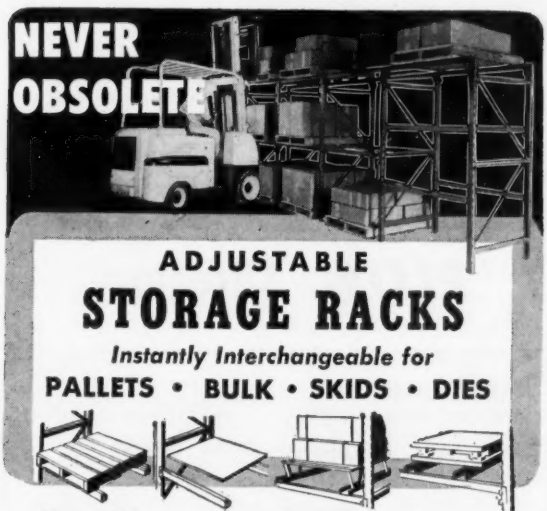


★ MANSAVER INDUSTRIES, INC. • 3103 EAST ST., NEW HAVEN, CONN. ★



ADJUSTABLE

STORAGE RACKS

Instantly Interchangeable for

PALLETS • BULK • SKIDS • DIES

The secret is the **"FLOATING WEDGE LOCK"**

Patents pending

New, different assembly principle—No tools, nuts, bolts, erection welding or special labor!

As your needs change — *so do* STURDI-BILT *Adjustable* STORAGE RACKS!

This revolutionary new storage rack is designed to handle pallets, skids, dies or bulk *interchangeably* in a matter of seconds. Not only do you have new freedom in *types of storage*, but with on-the-spot respacing of the vertical openings, you can handle more efficiently *any* daily storage fluctuations or demands. One or two pallet width openings. Heights to fit your needs — and they *stack* for added utility.

WRITE TODAY for more information about the *only* system that *plans* for the future!

A few territories available for qualified Materials Handling Dealers

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2501 Petersen Ave., Chicago 45, Ill.

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HAUL FREIGHT FAST—SAFELY EFFICIENTLY—with

HOWE "IN FLOOR" DRAGLINE TRUCKS

This dragline truck is another of the Howe carefully designed, ruggedly built, special purpose trucks.

From Featherlite two-wheeled case and keg trucks to 12 ton ingot cars, Howe can furnish the truck you need—backed by 79 years of truck manufacturing know-how.

Special coupling-pin for under-the-floor draglines can be attached to several models of Howe trailer or platform trucks.

Truck Division

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INCORPORATED

Rutland, Vt.

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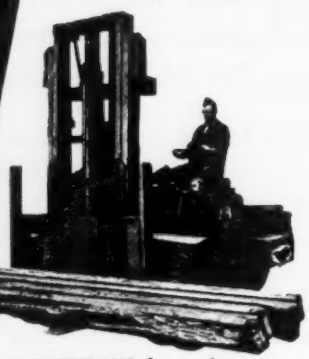
SILENT HOIST
LIFTRUK
on the
"DAY-BY-DAY
EARN-ITS-WAY
PLAN"

3-5-7½-10-15 ton
CAPACITIES



If you can reasonably use a Heavy Duty LIFTRUK for at least two hours a day average, to improve the movement of goods in process or reduce materials handling operations, then you should be interested in this unusual "rent-or-pay-as-you-use" plan. Proper cost accounting methods often show that man-hours saved, storage space gained, or time in transit reduced, add up to a profit well above the payments required for LIFTRUK for purchase or rental charges.

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Write for "Earn-Its-Way" Plan to

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Pioneer Mfrs. of Heavy Duty Materials-Handling Equipment
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FOR SALE

Simplex B-17 Cellophane Bag Making Machine, capable of making deluxe bags, gusset bags, etc. Has attachment for making printed bags, holes in bags and double labels. Have plates for most size bags.

Bartman & Bixer, Inc.
Brighton & Walnut Sts.
Clifton, N. J.

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Engineer—5-10 years experience in engineering, construction and process design. Must be capable of directing all phases of engineering design and construction work in connection with ore dressing and chemical processing plants. Southwest USA. Salary open. Write, c/o FLOW, Box 1156.

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HYDRAULIC DRIVE WINCHES

New, lightweight hydraulic drive winches quickly solve any material handling problem with ease. These versatile winches can be installed on fork lifts, highway trucks, wreckers or in stationary locations. Ideal for smooth truck loading and unloading and for moving materials and equipment. Capacities available from 2,500 to 5,800 lbs.

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"Cost Cutter"
CONVEYORS
Light • Low Cost • Versatile
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BOXES, BAGS
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OTHERS FROM
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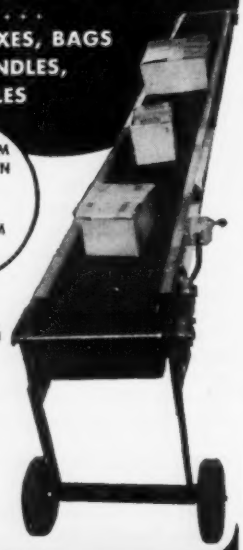

Electric or gasoline drive. Other flat and trough belt conveyors for inclined or horizontal applications.

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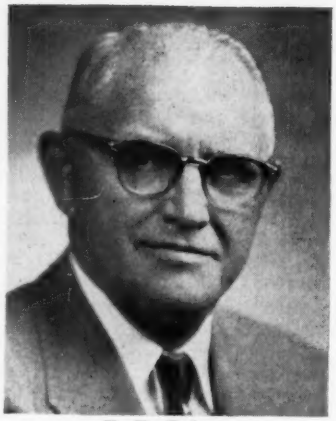
New London, Dept. F, Wisconsin

Boberg to Head Conveyor Equipment Manufacturers

E. E. Boberg was elected president of the Conveyor Equipment Manufacturers Association for 1956 at the group's 22nd annual meeting in White Sulphur Springs, W. Va. Vice president, sales, of Standard Conveyor Company, he succeeds Jervis C. Webb as head of the 200 million-dollar-a-year industry.

Other officers named were J. H. Walker, Fairfield Engineering Co., vice president; Adrian W. Rich, Fairmont Machinery Co., treasurer; and H. E. Murken, Hewitt-Robins Incorporated, secretary. Directors include R. Y. MacIntyre, Continental Gin Co.; F. J. Shude, Anchor Steel & Conveyor Co.; and D. E. Davidson, Link-Belt Co. R. C. Sollenberger was re-elected executive vice president to head the association's office in Washington, D. C.

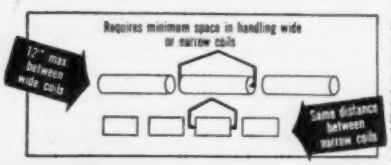


E. E. Boberg

Handling Coil Stock?
CHECK THESE
C-F LIFTER
ADVANTAGES

- 1 Lifter handles wide range of coil sizes
- Requires minimum of only 10" to 12" between piles —saves storage room
- 1 man operation — eliminates hookers
- Positive grip on coil — no damage to material

• C-F Coil Lifters are saving time and labor in many plants and warehouses because they can pick up, carry and set down a coil of steel faster and safer than any other method. Infinite jaw openings permit handling a very wide range of coil widths . . . carrying legs open fast, stay open until operator closes them on coil. Narrow legs require minimum space between piles – a space saving advantage. Made in motorized models for crane cab or pendant operation as well as manual types with chain wheel, in capacities from 3 tons up. Powered Rotating Heads available. Opening ranges to suit your requirements. Write for illustrated Bulletin.



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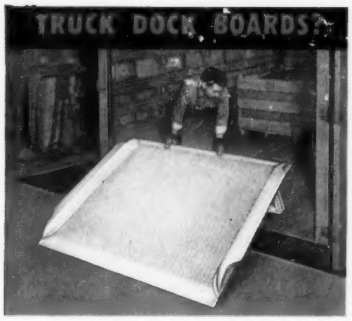
WHICH MAGLINER DOCK BOARD

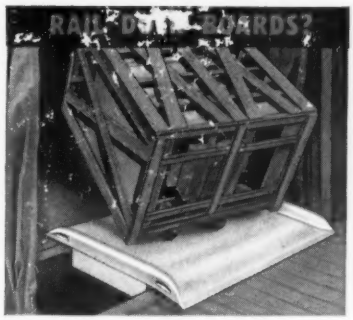
will best solve YOUR Loading Problems?

TRUCK DOCK BOARDS?



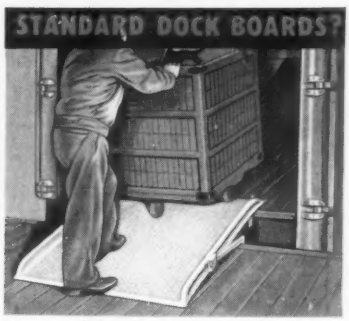
There is a wide variance in the size, height, and widths of modern motor freight carriers. These factors accordingly, are of prime importance in providing the right truck dock board, and must be taken into full account along with the specific requirements of your dock and loading equipment.

RAIL DOCK BOARDS?



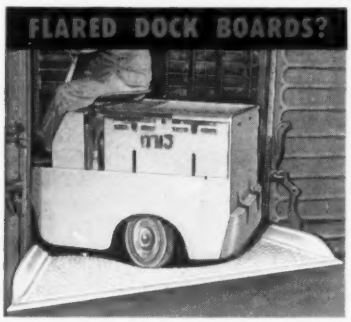
Freight cars too, vary greatly in type, overall width, door width, etc. Here again these important factors must be carefully considered to get the most from your dock board. Magliner Dock Boards give you the most, because they are engineered specifically to meet the requirements of your dock . . . equipment and operating conditions!

STANDARD DOCK BOARDS?



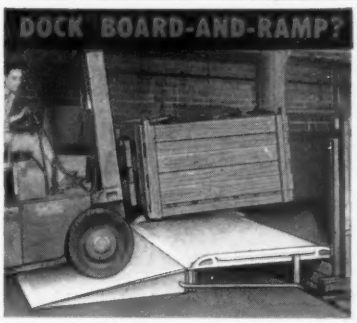
For handling light loads under normal conditions, Magliner Standard Dock Boards for truck docks are ideal. Standard dock boards are available in a wide range of sizes. They are equipped with Magline's patented, automatic drop lock, and are fully adjustable for varying differences in height and span. Immediate shipment from stock.

FLARED DOCK BOARDS?



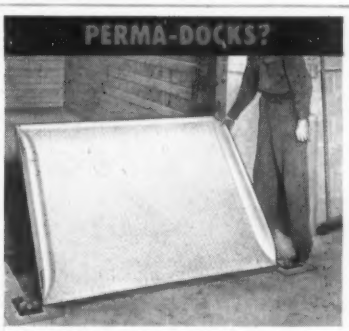
Where narrow aisles and crowded, cramped quarters prevail, flared dock boards are recommended to provide maximum facility for equipment movement. Magliner flared dock boards permit sharp turns to be made in restricted areas. This provides easier access into carriers—and often much of the turn can be made on the board itself.

DOCK BOARD-AND-RAMP?



Magliner dock board-and-ramp combinations are recommended where dock-to-carrier height differences exceed the normal range. Use of the board-and-ramp lengthens the slope and modifies the grade angle, for safe and efficient operation. These 2-piece units are lightweight and easily positioned by one man. The dock board can be used independently of the ramp.

PERMA-DOCKS?



Where permanent installations are indicated, Magliner Perma-Docks provide many outstanding advantages! They save up to 65% in installation costs over other dock systems, and give years of cost-free, maintenance-free operations. No counter balances or costly leveling devices required. One man easily raises or lowers the dock board.

MOBILE LOADING RAMPS?

A loading dock on wheels! Where you want it . . . when you want it! Ideal for servicing yard cars or highway trailers. Lightweight—easily moved about. Hydraulic lift positions it. More and more firms are using Magliner Mobile Loading Ramps as an auxiliary loading unit to relieve overtaxed dock facilities. They're practical, economical, and efficient!

Your dock and its requirements—your equipment and loads—your operating conditions . . . these are the factors which determine the type of dock board that will best solve your loading problem. Regardless of which type Magliner board you require, it will have all of the outstanding design and construction advantages which have made Magliner a recognized leader in this highly specialized field.

It will pay you to investigate the many ways in which Magliner Dock Boards can reduce loading costs, and step-up dock handling efficiency. Write today for your copy of Magliner Bulletin DB-204.

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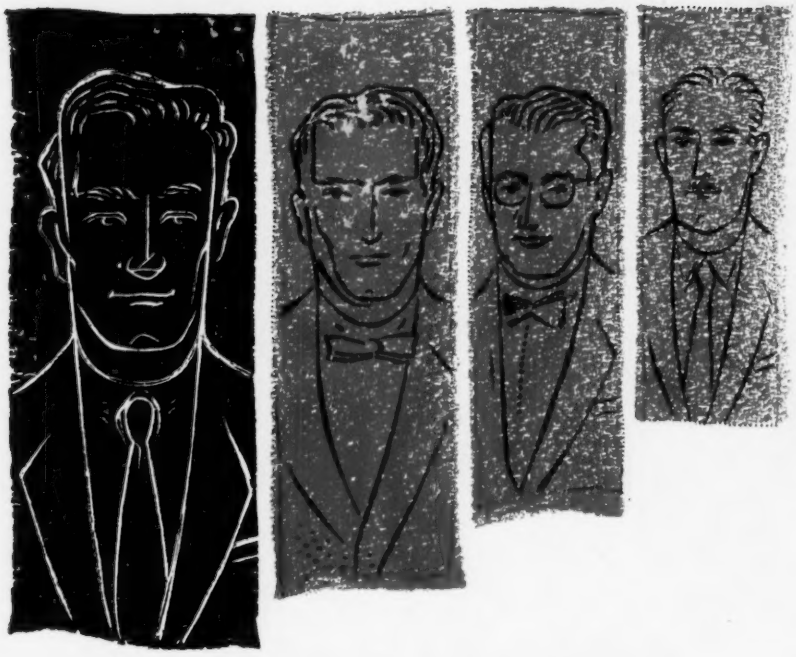

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